Chapter 1

Introducing HTML5

Objectives:

- Learn what HTML5 is about
- Discover what HTML5 really is
- Find out what HTML5 and CSS3 features are supported by today’s web browsers
- Discuss the wide range of HTML5 developer tools
Overview

ECMAScript, HTML5, and CSS3 are new standards that are being embraced by both the developer communities and the web browser vendors. The hardest part of creating web pages using these cutting edge technologies is ensuring that they still render usable content across all browsers, including the weakest (oldest?) web browser we choose to support – the lowest common denominator.

This chapter introduces the world of HTML5 Web development. It first examines the history of HTML5 and how we got here. It then cuts to the chase and explains what makes up HTML5. It also covers the HTML5 features that are available in today's web browsers and what developer tools are available for users of Windows or Apple operating systems as well as different development platforms, such as Java and .NET.
Where Did HTML5 Come From?

- **HTML5** is the latest standard (version 5.0) of the Hypertext Markup Language used for outlining and displaying documents to be rendered by many different user agents.
  - What is a user agent? A user agent is an application designed to load and consume web content over the Internet.
  - Besides the Web browsers used with computers, laptops, and smartphones, user agents also include screen readers for the visually impaired, search engine tools (spiders) for increased search engine optimization (SEO), and (unfortunately) even Internet hacking tools and scripts.
  - The HTML5 standards outline by the World Wide Web Consortium (W3C) uses the term “user agent” frequently when referring to Web browsers rendering the HTML content.

- **HTML version 1, 2, and 3** were all ratified in the same year when the HTML standards were first introduced in 1995.
  - These early editions did not use Cascading Style Sheets (CSS) to modify the appearance of the pages.
  - Instead, they included tags to signify styles, such as `<center>`, `<font>`, and `<b>`.
  - HTML4 was released in 1997 with the recognition that CSS could also be used to set the “style” of a Web page.

- **HTML 3.2 was released in January, 1997 and then HTML4.0 was released in December, 1997.**
  - HTML 4.01 was recommended in December, 1999, fixing bugs found in the HTML 4.0 specification.
  - XHTML1.0, which treats HTML documents as well-formed XML documents, relies on the HTML 4.01 specification for most of its coding requirements.
  - The W3C assumed that HTML would soon be pushed to the sidelines and be superseded by XHTML from the web browser vendors.
  - The W3C continued to push for newer versions of the standard, including XHTML 1.1 and the unfinished XHTML 2.0.
Even though XML was all the rage in the late ‘90s, the W3C was wrong about XHTML.

- In 2004, the W3C had a meeting which included the plans to break compatibility with the current HTML 4.01 standards to instead pursue the XHTML 2.0 standards.
- A few days later, a group of developers from several different companies who felt disheartened from the meeting believed the W3C was leaving web browser vendors behind.

They formed their own group with folks from Opera, Mozilla, and Apple and called it the Web Hypertext Application Technology Working Group (WHATWG, http://www.whatwg.org).

- Led by Ian Hickson from Opera, its purpose was to create its own set of standards for the web browsers without breaking compatibility with HTML 4.01.
- Initially they created Web Form 2.0, which was folded into the HTML5 standards.

As the W3C continued with the XHTML 2.0 standards, the WHATWG continued work on their HTML5 standards.

- Recognizing that the browser developers had no interest in adding any support for the new XHTML 2.0 tags, the W3C dropped XHTML 2.0 development.
- They grabbed the latest standards from the WHATWG’s site and called it HTML5.
- The W3C refers to the practice of recognizing and accepting the standard practices followed by the latest browsers as “paving the cowpaths”.

Somewhat bitter about losing the control of the HTML5 standards to the W3C, the WHATWG removed the version number from their HTML standards.

- They instead prefer to think of their standards as part of a “living document” that changes along with the standards.
- Everyone is welcome to participate in helping mold the future of HTML.
What is HTML5 Exactly?

- Although HTML5 was originally based on new form tags with Web Forms 2.0, it now also includes new APIs accessible from JavaScript and new media tags for audio, video, and graphics.
  - Some of the technologies included with HTML5 books and tutorials are not technically HTML5.
  - They are just additional W3C specifications that are also in the running to be accepted by web browser developers and vendors.
  - For example, the WebSocket API and the famous Microsoft AJAX object, XMLHttpRequest (XHR), are actually preexisting specifications that are being added as part of HTML5.

- Although XHTML2 has officially been dropped by the W3C, there still is a new XHTML5.
  - HTML5 is still not case-sensitive, doesn’t require closing tags, and doesn’t require quotation marks around attribute values.
  - XHTML5 is a way of writing HTML5 by treating the page as a well-formed XML document.

- The XHTML5 schema is not actually enforced by a DTD reference.
  - Instead, it is the same XHTML 1.0 rules enforced by web developers to HTML5 elements and attributes, treating the document as XML.
  - Most HTML5 development tools also support XHTML5 development.
• The latest HTML5 standards are available on the W3C web site:
  http://www.w3.org/TR/htmlmarkup/
- **HTML5 includes the following 30 new tags (elements):**

<table>
<thead>
<tr>
<th>New HTML5 Tags</th>
<th>Official W3C Summary Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;article&gt;</code></td>
<td>article</td>
</tr>
<tr>
<td><code>&lt;aside&gt;</code></td>
<td>tangential content</td>
</tr>
<tr>
<td><code>&lt;audio&gt;</code></td>
<td>audio stream</td>
</tr>
<tr>
<td><code>&lt;bdi&gt;</code></td>
<td>BiDi isolate</td>
</tr>
<tr>
<td><code>&lt;canvas&gt;</code></td>
<td>canvas for dynamic graphics</td>
</tr>
<tr>
<td><code>&lt;command&gt;</code></td>
<td>command</td>
</tr>
<tr>
<td><code>&lt;datalist&gt;</code></td>
<td>predefined options for other controls</td>
</tr>
<tr>
<td><code>&lt;details&gt;</code></td>
<td>control for additional on-demand information</td>
</tr>
<tr>
<td><code>&lt;embed&gt;</code></td>
<td>integration point for plugins</td>
</tr>
<tr>
<td><code>&lt;figcaption&gt;</code></td>
<td>figure caption</td>
</tr>
<tr>
<td><code>&lt;figure&gt;</code></td>
<td>figure with optional caption</td>
</tr>
<tr>
<td><code>&lt;footer&gt;</code></td>
<td>footer</td>
</tr>
<tr>
<td><code>&lt;header&gt;</code></td>
<td>header</td>
</tr>
<tr>
<td><code>&lt;hgroup&gt;</code></td>
<td>heading group</td>
</tr>
<tr>
<td><code>&lt;keygen&gt;</code></td>
<td>key-pair generator/input control</td>
</tr>
<tr>
<td><code>&lt;mark&gt;</code></td>
<td>marked (highlighted) text</td>
</tr>
<tr>
<td><code>&lt;meter&gt;</code></td>
<td>scalar gauge</td>
</tr>
<tr>
<td><code>&lt;nav&gt;</code></td>
<td>group of navigational links</td>
</tr>
<tr>
<td><code>&lt;output&gt;</code></td>
<td>result of a calculation in a form</td>
</tr>
<tr>
<td><code>&lt;progress&gt;</code></td>
<td>progress indicator</td>
</tr>
<tr>
<td><code>&lt;rp&gt;</code></td>
<td>ruby parenthesis</td>
</tr>
<tr>
<td><code>&lt;rt&gt;</code></td>
<td>ruby text</td>
</tr>
<tr>
<td><code>&lt;ruby&gt;</code></td>
<td>ruby annotation</td>
</tr>
<tr>
<td><code>&lt;section&gt;</code></td>
<td>section</td>
</tr>
<tr>
<td><code>&lt;source&gt;</code></td>
<td>media source</td>
</tr>
<tr>
<td><code>&lt;summary&gt;</code></td>
<td>summary, caption, or legend for a details control</td>
</tr>
<tr>
<td><code>&lt;time&gt;</code></td>
<td>date and/or time</td>
</tr>
<tr>
<td><code>&lt;track&gt;</code></td>
<td>supplementary media track</td>
</tr>
<tr>
<td><code>&lt;video&gt;</code></td>
<td>video</td>
</tr>
<tr>
<td><code>&lt;wbr&gt;</code></td>
<td>line-break opportunity</td>
</tr>
</tbody>
</table>
• It also includes the following 13 new `<input>` types:

<table>
<thead>
<tr>
<th>New HTML5 Input Types</th>
<th>Official W3C Summary Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&lt;input type=datatime</code></td>
<td>global date-and-time input control</td>
</tr>
<tr>
<td><code>&lt;input type=datatime-local</code></td>
<td>local date-and-time input control</td>
</tr>
<tr>
<td><code>&lt;input type=date</code></td>
<td>date input control</td>
</tr>
<tr>
<td><code>&lt;input type=month</code></td>
<td>year-and-month input control</td>
</tr>
<tr>
<td><code>&lt;input type=time</code></td>
<td>time input control</td>
</tr>
<tr>
<td><code>&lt;input type=week</code></td>
<td>year-and-week input control</td>
</tr>
<tr>
<td><code>&lt;input type=number</code></td>
<td>number input control</td>
</tr>
<tr>
<td><code>&lt;input type=range</code></td>
<td>imprecise number-input control</td>
</tr>
<tr>
<td><code>&lt;input type=email</code></td>
<td>e-mail address input control</td>
</tr>
<tr>
<td><code>&lt;input type=url</code></td>
<td>URL input control</td>
</tr>
<tr>
<td><code>&lt;input type=search</code></td>
<td>search field</td>
</tr>
<tr>
<td><code>&lt;input type=tel</code></td>
<td>telephone-number-input field</td>
</tr>
<tr>
<td><code>&lt;input type=color</code></td>
<td>color-well control</td>
</tr>
</tbody>
</table>

• Professionals of HTML5 tend also to include the following APIs:

<table>
<thead>
<tr>
<th>New HTML5 APIs</th>
<th>Official W3C Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>WebSocket API</td>
<td>enables Web pages for two-way communication with a remote host</td>
</tr>
<tr>
<td>File API</td>
<td>provides an API for representing file objects in web applications</td>
</tr>
<tr>
<td>Offline Applications</td>
<td>ensures Web apps are available when not connected to their network</td>
</tr>
<tr>
<td>Drag and Drop</td>
<td>allow dragging and dropping items in a web browser</td>
</tr>
<tr>
<td>XMLHttpRequest</td>
<td>provides client script for transferring data between a client/server</td>
</tr>
<tr>
<td>Web Workers</td>
<td>allows Web app to spawn threads to run scripts in parallel to page</td>
</tr>
<tr>
<td>Web Storage</td>
<td>for persistent data storage of key-value pair data in Web clients</td>
</tr>
<tr>
<td>History API</td>
<td>provides historical tracking of pages visited on site</td>
</tr>
<tr>
<td>Geolocation</td>
<td>for geographical location identification of web users</td>
</tr>
<tr>
<td>Canvas</td>
<td>allow drawing canvas using JavaScript</td>
</tr>
<tr>
<td>SVG</td>
<td>provides Scalable Vector Graphics for drawing scalable images</td>
</tr>
<tr>
<td>IndexedDB</td>
<td>for client-side index-able database storage with key/value data</td>
</tr>
</tbody>
</table>
• **Graphics and media are support by the new media elements.**
  
  - The `<audio>`, `<video>`, and `<canvas>` tags are new with HTML5 and offer the ability to include media and graphics programming.
  
  - Scalable Vector Graphics (SVG) is not new with HTML5 but it is another graphics engine supported natively by today's latest web browsers.

• **The `<canvas>` tag is also supported by all the latest web browsers.**
  
  - Its specification is so large that it gets its own set of documents on the W3C web site.
  
  - It supports both 2D graphics and 3D graphics (using WebGL.)
  
  - SVG and Canvas threaten to eventually end the life of Adobe Flash and Microsoft Silverlight!

• **There are also new `<input>` types added to web forms.**
  
  - These simplify data entry within the browser on the desktop as well as on alternative devices and display the data in a richer, friendlier fashion.
  
  - Some native client-side validation has been added,

• **CSS3 is also something that often gets mentioned with HTML5.**
  
  - Although it is a completely separate and smaller specification, it is something that will soon be supported by all the web browsers.
  
  - Although a completely different set of standards, CSS3 had to be upgraded with HTML5. For example, it had to be able to stylize the new HTML5 tags.
Current Web Browser Support for HTML5

- **User agent developers across all platforms are working hard to implement all the features of HTML5 and CSS3.**
  - Support for new features changes with new releases of each of the web browsers or updates.

- **These changes occur almost weekly.**
  - Why, as you were just reading this page, additional support was just added to one of the Web browsers! 😊

- **Web developers must know the types of web browsers (user agents) being used by web visitors.**
  - This is easy to establish if creating a web application that will only used internally by employees or privately with partners.
  - Rules can be established, requiring users to utilize only certain web browsers of certain versions with essential plug-ins.

- **If you don’t have that luxury, then you probably will have to create a site that supports the most popular Web browsers paying attention to their versions - not necessarily most popular with developers!**
  - This means you must create sites that display content successfully for most web visitors.
  - You can add the new features of HTML5 and CSS3 for the more powerful browsers, so long as your site gracefully degrades to acceptable content for less powerful browsers.

- **REMEMBER:** It is much easier (and quicker) to upgrade a simple web site with new HTML5 and CSS3 features than it is to take an existing HTML5 site and fix it to work with older browsers.
• Please be respectful of the many reasons that a lot of Web users cannot always upgrade their web browsers or cannot use different browsers.
  
  • Corporate policies may prevent users from surfing with anything other than a certain brand of a browser (for example, Internet Explorer) or a certain version of a web browser.
  
  • Operating systems may prevent a browser from being upgraded.
  
  • For example, Windows XP will not allow users to upgrade to IE9 or newer and some smartphones may not support upgraded browsers.

• You can find out which web browsers (desktop and mobile) are the most popular ones being used today by checking out the latest updated statistics on Net Market Share’s site: (http://marketshare.hitslink.com)

• The browser statistic links are circled on the left side.
  
  • The screenshot above was for March, 2012, as shown on the right side.
  
  • Question: The largest IE market is still IE8. What’s keeping a large number of those folks from just upgrading to IE9?
There are several different web sites available that show what HTML5 and CSS3 features are supported by today’s web browsers.

Because HTML5 support seems to change weekly, be sure that the content has been kept up to date.

The HTML5 Test web site accurately reports the HTML5 support by the browser you use to view it: (http://html5test.com)
- The CSS3 Test Site actually performs a live test in your current web browser: (http://css3test.com)
To complete the browser test suite, you could also check out the ECMAScript Language test for script compatibility: (http://test262.ecmascript.org/)

- **Warning**: This test takes a while to perform.
Even the W3c has a series of tests that can be used to determine a web browser's capabilities: (http://test.w3c-test.org/)

W3C would like to thank Microsoft who donated the server that allows us to run this service.
Here is a site that illustrates a side-by-side comparison between some of the latest browsers: (http://www.findmebyip.com/litmus)

Here are some other awesome sites that can tell you what is currently supported by today’s web browsers:

- http://caniuse.com/ (Great details and updated often)
- http://haz.io/ (Uses Modernizr)
- http://mobilehtml5.org/ (Obviously, for mobile development)
Choose A Developer Tool – Whichever You Prefer!

- HTML5, CSS3, and JavaScript are, of course, stored in text files.
  - You can use whichever text editor you prefer – even Notepad in a pinch!
  - Some editors give automatic support for HTML5, XHTML5, and CSS3 while other require custom plug-ins.
  - Some editors are free while others are going to cost you (or your boss) a few greenbacks.
  - Thankfully, there is quite a selection of editors to choose from!

- For developers who want to use a fresh new editor, they may want to consider using a simple free editor to start with.
  - You will generally have a better experience if you download and install a simple HTML5 and CSS3 editor.

- Alternately, you may consider a WYSIWYG web-based editor, which is primarily designed to works with page-based editing or supporting a CMS editing page.
  - These editors require you to use a browser that already supports the latest HTML5 features.

- Here are some free online HTML5 web editors:
  - Maqetta: http://maqetta.org/
  - Mercury Editor: http://jejacks0n.github.com/mercury/
  - Aloha Editor: http://aloha-editor.org/
  - Rendera: http://rendera.heroku.com/
  - Blue Griffon: http://www.bluegriffon.org/ (also downloadable!)
  - HTML5 Editor: http://www.html5-editor.org/
  - Raptor Editor: http://www.raptor-editor.com/
For Windows, you can download any free text editor but an editor that supports HTML5 and CSS3 will be better.

- CoffeeCup offers a free HTML editor that works nicely.  
  http://www.coffeecup.com/free-editor/

**Aptana Studio is a free yet awesome HTML5 editor as well.**

- It is available for Windows, Linux, and the Mac:  
  http://www.aptana.com/

**Eclipse, a favorite editor used by Java developers, offers support for HTML5.**

- HTML5 support was added starting with the Helios editions of Eclipse for Java EE Developers or Eclipse for JavaScript Web Developers,  
  http://www.eclipse.org/downloads/

- As a nice alternative, you can also use the free Eclipse plug-in from Aptana (above) for HTML5 support.

**Another choice for Mac users is MacFlux (for a fee.)**  
http://www.macwareinc.com/products/MacFlux/overview.html

- It’s available at other online stores as well, such as Amazon.com.

**Windows and Mac users may want to consider purchasing Adobe Dreamweaver CS5.5 or newer.**

- It isn’t cheap it but offers great support for implementing HTML5, CSS3, media files, and jQuery integration support.  

- It is priced as an upgrade, full product, or a subscription.
- **For developers comfortable with Microsoft tools, they offer a free web developer tool as well called Visual Web Developer Express:** [http://www.asp.net/vwd](http://www.asp.net/vwd)
  - Microsoft also offers the free web developer tool called WebMatrix: [http://www.microsoft.com/web/webmatrix/](http://www.microsoft.com/web/webmatrix/)
  - For HTML5 and CSS3 support in Visual Studio 2010, you will need to install the free Web Standards Update available in the Visual Studio Gallery: [http://visualstudiogallery.msdn.microsoft.com/a15c3ce9-f58f-42b7-8668-53f6cdc2cd83](http://visualstudiogallery.msdn.microsoft.com/a15c3ce9-f58f-42b7-8668-53f6cdc2cd83)
  - HTML5 and CSS3 support is already included with Visual Studio 2012 and newer.

- **Special Note: Be sure the operating system you use as the host for your developer tools supports the rendering and viewing of all media types.**
  - For example, some .NET developers may prefer to install Windows Server 2008 or newer instead of Windows 7 or newer to run other server-based software.
  - Unfortunately, Windows Server (all versions) does not include the codecs required to view certain media types within the web browser, such as MP3 and MP4 files.

- **Even more frustrating, these codecs cannot be installed to work within the web browser or Windows Media Player.**
  - Alternative tools, such as the free VLC Player and web browsers other than Internet Explorer, can be used in a pinch to play these types of files outside of the web browser.

- **If you insist on developing on Windows Server, be sure to enable the Sound Service so you can hear the media files.**
  - You will also need to be sure you have installed the latest video driver (standard VGA Adapter driver in the Device Manager won't do!).
  - Be sure you have installed the Desktop Experience Feature and started the Themes Windows service.
Let’s Get Started!

- **HTML5 is the next release of the HTML standards.**
  - Although the candidate recommendation for HTML5 is 2012, the proposed recommendation for HTML5 isn’t until 2022.
  - Most web browsers have already begun implementing many of the features to remain competitive in today’s market.

- **As stated before, it requires much more effort to upgrade existing web applications to HTML5 than create a new site from scratch.**
  - The time is now – embrace HTML5 and CSS3!

**Lab Exercise:** Introducing HTML5
Chapter Summary

- HTML5 is the latest successor of the HTML 4.01 standard.
- XHTML 2.0 didn’t really take off as a new Web standard as expected by the W3C.
- XHTML5 is really just a well-formed XML document using HTML5 tags.
- HTML5 includes new tags, new media types, and new Web APIs while CSS3 includes support for it.
- Different web browsers have different levels of support for HTML5 and CSS3 standards and the support is changing constantly as browsers evolve.
- Many different developer tools are available including free and purchased tools - some web-based and some installed.