

# HTML5

# Background

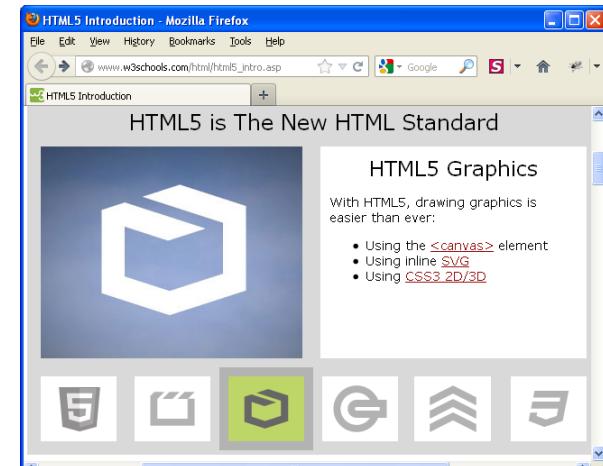
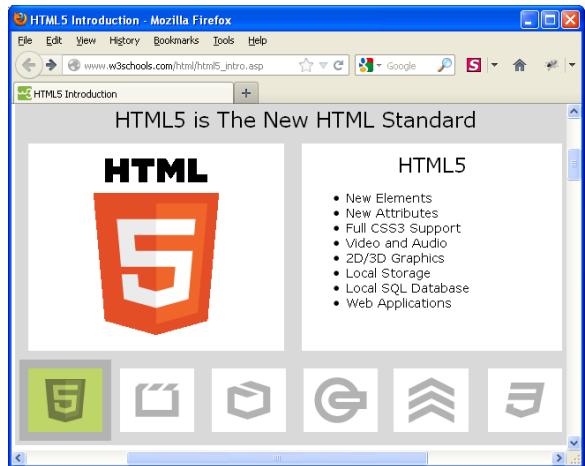
- HTML5 is being developed as the next major revision of HTML
- The Web Hypertext Application Technology Working Group (WHATWG) started work on the specification in June 2004
- HTML5 supersedes HTML 4.01, XHTML 1.0 and XHTML 1.1
- As of 12/17/2012, HTML5 Definition is “complete”:

<http://www.w3.org/2012/12/html5-cr>

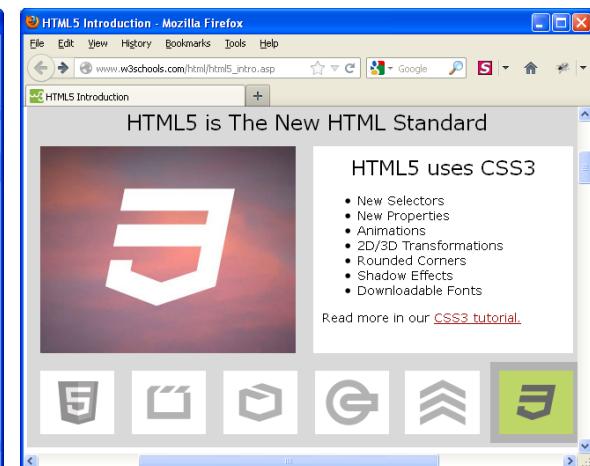
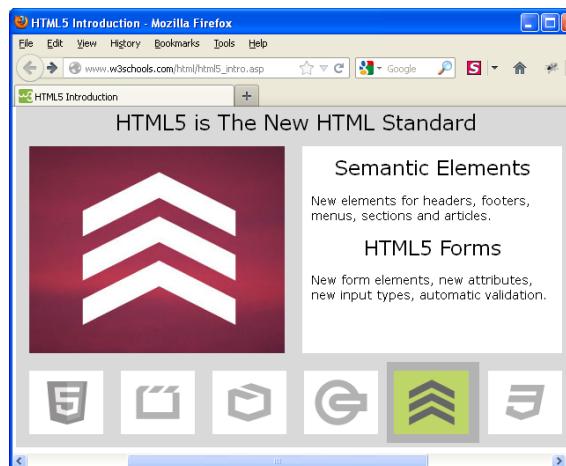
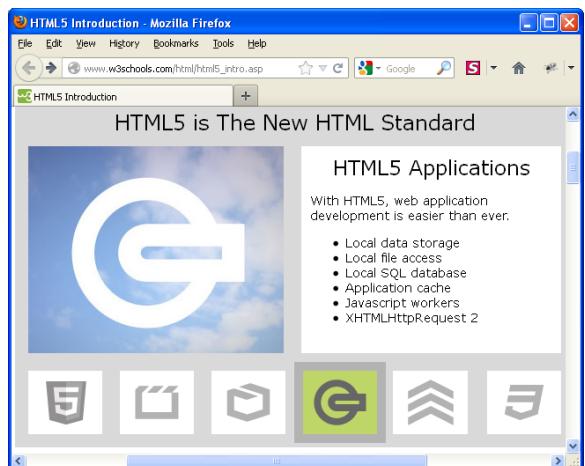
- HTML5 vocabulary and associated APIs “Recommendation” available at  
<http://www.w3.org/TR/html5/>
- HTML Canvas 2D Context “Recommendation” available at  
<http://www.w3.org/TR/2dcontext/>
- The latest versions of Safari, Chrome, Firefox, Opera, Edge and IE all have some support for HTML5, but it varies across the browsers. E.g., see:
  - [http://en.wikipedia.org/wiki/Comparison\\_of\\_layout\\_engines\\_\(HTML5\)](http://en.wikipedia.org/wiki/Comparison_of_layout_engines_(HTML5))
- HTML 5.2 2<sup>nd</sup> Edition “Recommendation” (Dec. 2017) available at  
<https://www.w3.org/TR/html52/>

# Major New Elements in HTML5

- New semantic elements like <header>, <footer>, <article> and <section>
- <video> and <audio> that you can embed on your web pages without resorting to third-party plug-ins
- Canvas, a two-dimensional drawing surface that you can program with JavaScript
- Scalable vector graphics (SVG)
- Geolocation, whereby visitors can choose to share their physical location with your web application
- Persistent local storage without resorting to third-party plug-ins
- Offline web applications that work even after network access is interrupted
- Improvements to HTML web forms
- Microdata, which lets you create your own vocabularies beyond HTML5 and extend your web pages with custom semantics
- New APIs for complex web applications including support for mobile devices
- See: [http://www.w3schools.com/html/html5\\_intro.asp](http://www.w3schools.com/html/html5_intro.asp)



## New Elements and attributes



## Local Storage API support

## New Semantic Elements/Forms

## Support for CSS3

html5 tutorial - Google ... HTML 5 Tutorial HTML 5 New Elements

www.w3schools.com/html5/html5\_new\_elements.asp

CSCI 572 Home Page CSCI 571 Home Page CSCI 351 Home Page Other bookmarks

## New Markup Elements

New elements for better structure:

Tag	Description
<article>	For external content, like text from a news-article, blog, forum, or any other content from an external source
<aside>	For content aside from the content it is placed in. The aside content should be related to the surrounding content
<command>	A button, or a radiobutton, or a checkbox
<details>	For describing details about a document, or parts of a document
<summary>	A caption, or summary, inside the details element
<figure>	For grouping a section of stand-alone content, could be a video
<figcaption>	The caption of the figure section
<footer>	For a footer of a document or section, could include the name of the author, the date of the document, contact information, or copyright information
<header>	For an introduction of a document or section, could include navigation
<hgroup>	For a section of headings, using <h1> to <h6>, where the largest is the main heading of the section, and the others are sub-headings
<mark>	For text that should be highlighted
<meter>	For a measurement, used only if the maximum and minimum values are known
<nav>	For a section of navigation
<progress>	The state of a work in progress
<ruby>	For ruby annotation (Chinese notes or characters)
<rt>	For explanation of the ruby annotation
<rp>	What to show browsers that do not support the ruby element
<section>	For a section in a document. Such as chapters, headers, footers, or any other sections of the document
<time>	For defining a time or a date, or both
<wbr>	Word break. For defining a line-break opportunity.

## New Markup Elements

[http://www.w3schools.com/html/html5\\_new\\_elements.asp](http://www.w3schools.com/html/html5_new_elements.asp)

## Summary of new HTML5 Elements

html5 tutorial - Google ... HTML 5 Tutorial HTML 5 New Elements

www.w3schools.com/html5/html5\_new\_elements.asp

CSCI 572 Home Page CSCI 571 Home Page CSCI 351 Home Page Other bookmarks

## New Media Elements

HTML 5 provides a new standard for media content:

Tag	Description
<audio>	For multimedia content, sounds, music or other audio streams
<video>	For video content, such as a movie clip or other video streams
<source>	For media resources for media elements, defined inside video or audio elements
<embed>	For embedded content, such as a plug-in

## The Canvas Element

The canvas element uses JavaScript to make drawings on a web page.

Tag	Description
<canvas>	For making graphics with a script

## New Form Elements

HTML5 offers more form elements, with more functionality:

Tag	Description
<datalist>	A list of options for input values
<keygen>	Generate keys to authenticate users
<output>	For different types of output, such as output written by a script

## New Input Type Attribute Values

Also, the input element's type attribute has many new values, for better input control before sending it to the server:

Type	Description
tel	The input value is of type telephone number
search	The input field is a search field
url	The input value is a URL
email	The input value is one or more email addresses
datetime	The input value is a date and/or time
date	The input value is a date
month	The input value is a month
week	The input value is a week
time	The input value is of type time
datetime-local	The input value is a local date/time
number	The input value is a number
range	The input value is a number in a given range
color	The input value is a hexadecimal color, like #FF8800

## New Media, Canvas, Form Elements

# HTML5 - Removed Elements

- The following elements are not in HTML 5 because their effect is purely presentational and therefore better handled by CSS:
  - *basefont, big, center, font, s, strike, tt, u*
- The following elements are not in HTML 5 because their usage affected usability and accessibility for the end user in a negative way:
  - *frame, frameset, noframes*
- *The following elements are not included because they have not been used often, created confusion or can be handled by other elements*
  - *acronym* is not included because it has created lots of confusion. Authors are to use *abbr* for abbreviations.
  - *applet* has been obsoleted in favor of *object*.
  - *isindex* usage can be replaced by usage of form controls.
  - *dir* has been obsoleted in favor of *ul*.

# HTML5 - Removed Attributes - Handled by CSS

- align attribute on caption, iframe, img, input, object, legend, table, hr, div, h1, h2, h3, h4, h5, h6, p, col, colgroup, tbody, td, tfoot, th, thead and tr.
- alink, link, text and vlink attributes on body.
- background attribute on body.
- bgcolor attribute on table, tr, td, th and body.
- border attribute on table, img and object.
- cellpadding and cellspacing attributes on table.
- char and charoff attributes on col, colgroup, tbody, td, tfoot, th, thead and tr.
- clear attribute on br.
- compact attribute on dl, menu, ol and ul.
- frame attribute on table.
- frameborder attribute on iframe.
- height attribute on td and th.
- hspace and vspace attributes on img and object.
- marginheight and marginwidth attributes on iframe.
- noshade attribute on hr.
- nowrap attribute on td and th.
- Width attribute on hr, table, td, th, col, colgroup and pre
- scrolling attribute on iframe.
- size attribute on hr, input and select.
- type attribute on li, ol and ul.
- valign attribute on col, colgroup, tbody, td, tfoot, th, thead and tr.
- rules attribute on table.

In an effort to simplify HTML many attributes have been eliminated as their effect is more properly produced using CSS

# <canvas> Element - Drawing

- The <canvas> element is “a resolution-dependent bitmap canvas which can be used for rendering graphs, game graphics, or other visual images on the fly.”
- A *canvas* is a rectangle in your page where you can use JavaScript to draw anything you want.
- A <canvas> element has no content and no border of its own.
- You can have more than one <canvas> element on the same page.
- Each canvas will show up in the DOM, and each canvas maintains its own state. If you give each canvas an id attribute, you can access them just like any other element.
- E.g. if one adds an id attribute, e.g.  
`<canvas id="mycanvas" width="300" height="225"></canvas>`
- Now you can easily find that <canvas> element in the DOM, e.g.  
`var a_canvas = document.getElementById("mycanvas");`

# <canvas> element - Drawing a Red Rectangle

The screenshot shows a web browser window titled "Tryit Editor v1.6" with the URL "www.w3schools.com/tags/tryit.asp?filename=tryhtml5\_canvas\_fillstyle". The page content includes a sidebar with "Get Certified" and "Study Web Technologies" links, and a main area for "HTML5 Video" from DigitalClassroom.com. Below this, the "Source Code:" and "Result:" sections are displayed. The source code is as follows:

```
<!DOCTYPE html>
<html>
<body>

<canvas id="myCanvas" width="300" height="150" style="border:1px solid #d3d3d3;">
Your browser does not support the HTML5 canvas tag.</canvas>

<script>

var c=document.getElementById("myCanvas");
var ctx=c.getContext("2d");
ctx.fillStyle="#FF0000";
ctx.fillRect(20,20,150,100);

</script>

</body>
</html>
```

The "Result:" section shows a red rectangle centered on a white background.

**Every canvas has a drawing context.**

Once you have found a <canvas> element in the DOM you call its **getContext ()** method. You must pass the string "2d" to the **getContext ()** method

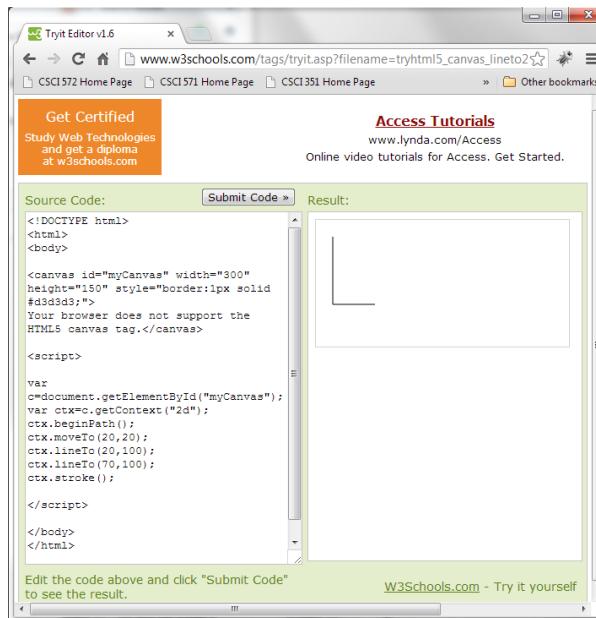
**JavaScript and DOM are used to create a red rectangle**

[https://www.w3schools.com/tags/tryit.asp?filename=tryhtml5\\_canvas\\_fillrect](https://www.w3schools.com/tags/tryit.asp?filename=tryhtml5_canvas_fillrect)

# <canvas> element - Coordinates

- The canvas is a two-dimensional grid. The coordinate (0, 0) is at the upper-left corner of the canvas. Along the X-axis, values increase towards the right edge of the canvas. Along the Y-axis, values increase towards the bottom edge of the canvas.
- To draw straight lines in pencil, you use the following two methods:
- moveTo(x, y)** moves the pencil to the specified starting point.
- lineTo(x, y)** draws a line to the specified ending point.

Move to (20,20)  
Draw a line to (20,100)  
Draw a line to (70,100)  
stroke() makes the lines  
Visible



The screenshot shows a browser window titled "Tryit Editor v1.6" displaying a web page from "www.w3schools.com". The page contains a "Source Code" section with the following HTML and JavaScript code:

```
<!DOCTYPE html>
<html>
<body>

<canvas id="myCanvas" width="300" height="150" style="border:1px solid #333333;">
Your browser does not support the HTML5 canvas tag.</canvas>

<script>
var c=document.getElementById("myCanvas");
var ctx=c.getContext("2d");
ctx.beginPath();
ctx.moveTo(20,20);
ctx.lineTo(20,100);
ctx.lineTo(70,100);
ctx.stroke();
</script>
</body>
</html>
```

The "Result" section shows a white canvas with a single black line segment drawn from (20, 20) to (70, 100).

[https://www.w3schools.com/tags/tryit.asp?filename=tryhtml5\\_canvas\\_stroke](https://www.w3schools.com/tags/tryit.asp?filename=tryhtml5_canvas_stroke)

# Drawing Context

- There's a whole group of properties and methods devoted to drawing rectangles:
- The fillStyle property can be a CSS color, a pattern, or a gradient. The default fillStyle is solid black, but you can set it to whatever you like.
- A gradient shows a difference in concentrations over an area, often using color intensity
- CreateLinearGradient(x0,y0,x1,y1) returns a canvas gradient object starting at (x0,y0) and ending at (x1,y1)
- addColorStop(offset, color) adds a color stop with the given color to the gradient at the offset; 0 offset is at one endpoint and 1 offset is at the other endpoint
- fillRect (x, y, width, height) draws a rectangle filled with the current fill style.
- clearRect (x, y, width, height) clears the pixels in the specified rectangle.

See <http://www.colorzilla.com/gradient-editor/>

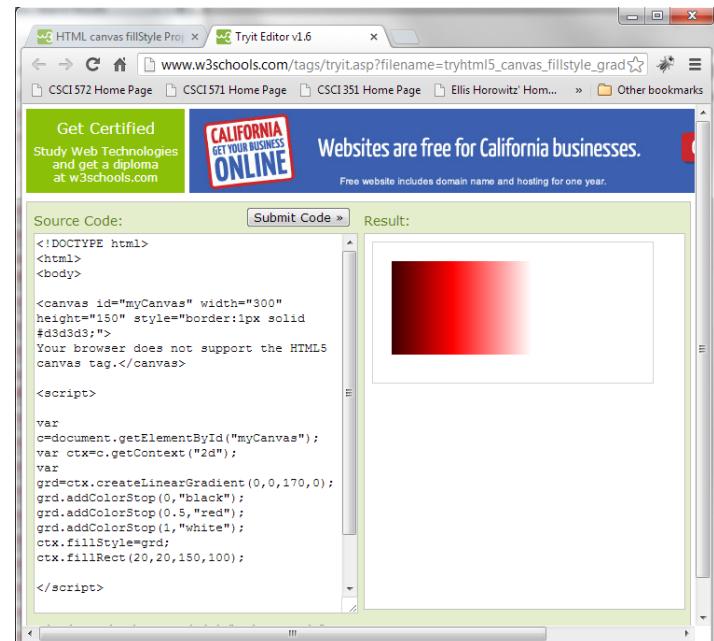
for the Ultimate CSS Gradient Generator  
or CSS Gradients in HTML5

<http://www.fix-css.com/2011/07/css-gradients-in-html5/>

Code to the right first defines a linear gradient region;  
AddColorStop is then used to set black at the left endpoint  
and white at the right endpoint; fillStyle is a context  
property that when set to grd causes the color to fill the  
region as shown

See

[http://www.w3schools.com/html/tryit.asp?filename=tryhtml5\\_canvas\\_tut\\_grad](http://www.w3schools.com/html/tryit.asp?filename=tryhtml5_canvas_tut_grad)



# <svg> Element - Drawing

- The <svg> element is “a container for SVG graphics.”
- SVG has several methods for drawing paths, boxes, circles, text and graphs images.
- SVG graphics is supported by all major browsers.
- SVG is a language for describing 2D graphics in XML.
- Since SVG is XML based, every element is available in the SVG DOM.
- If attributes of an SVG object are changed, the browser can automatically re-render the shape.

Canvas	SVG
<ul style="list-style-type: none"><li>• Resolution dependent</li><li>• No support for event handlers</li><li>• Poor text rendering capabilities</li><li>• You can save the resulting image as .png or .jpg</li><li>• Well suited for graphic-intensive games</li></ul>	<ul style="list-style-type: none"><li>• Resolution independent</li><li>• Support for event handlers</li><li>• Best suited for applications with large rendering areas (Google Maps)</li><li>• Slow rendering if complex (anything that uses the DOM a lot will be slow)</li><li>• Not suited for game applications</li></ul>

Comparison of Canvas and SVG

# Document Structure

```
<div id="header">
```

```
<div id="nav">
```

```
<div class="article">
```

```
<div class="section">
```

```
<div id="footer">
```

Old Way

```
<header>
```

```
<nav>
```

```
<article>
```

```
<section>
```

```
<footer>
```

```
<aside>
```

New Way

- HTML5 introduces a whole set of new elements that make it much easier to structure pages.
- By identifying the purpose of sections in the page using specific sectioning elements, assistive technology (e.g. for the blind) can help the user to more easily navigate the page.
- For example, they can easily skip over the navigation section or quickly jump from one article to the next without the need for authors to provide skip links.
- Authors also benefit because replacing many of the divs in the document with one of several distinct elements can help make the source code clearer, easier to author, and easier to scrape

See [https://www.w3schools.com/html/html5\\_semantic\\_elements.asp](https://www.w3schools.com/html/html5_semantic_elements.asp)

# Defining Sections of a Web Page with <section> Element

- <section> - a grouping of content, e.g. chapters or tabbed pages or a page is divided into Introduction, News Items and Contact Information
- Example of an article about apples with two sections

```
<article> <hgroup>
<h1>Apples</h1>
<h2>Tasty, delicious fruit!</h2> </hgroup>
<p>The apple is the pomaceous fruit of the apple tree.</p>
<section> <h1>Red Delicious</h1>
<p>These bright red apples are the most common found in many
supermarkets.</p> </section>
<section> <h1>Granny Smith</h1>
<p>These juicy, green apples make a great filling for apple pies.</p>
</section>
</article>
```

Don't use <section> just as hook for styling or scripting;  
For that you should use <div>

Don't use <section> if <article>, <aside> or <nav> is more appropriate  
Don't use <section> unless there is naturally a heading at the start of  
the section

# Defining Sections of a Web Page with <nav> Element

- <nav> - a section of a page that links to other pages or to parts within the page; a section with navigation links
- In the following example, the page has several places where links are present, but only one of those places is considered a navigation section.

```
<body> <header>
<h1>Wake up sheeple!</h1>
<p><a href="news.html">News</a> -
   <a href="blog.html">Blog</a> -
   <a href="forums.html">Forums</a></p>
<p>Last Modified: <time>2009-04-01</time></p>
<b><nav> <h1>Navigation</h1>
<ul>
  <li><a href="articles.html">Index of all articles</a></li>
  <li><a href="today.html">Things needed to wake up for today</a></li>
  <li><a href="successes.html">Sheep manage to wake</a></li>
</ul>
</nav>
</header> <div>
<b><article> <header> <h1>My Day at the Beach</h1>
```

# Defining Sections of a Web Page with <article> Element

- <article> - a component of a page that consists of a self-contained portion intended to be independently distributable or reusable;
  - This could be a forum post, a magazine or newspaper article, a blog entry, a user-submitted comment, an interactive widget or gadget, or any other independent item of content; Here is an example of a blog post showing an article followed by two comments:

```
<article> <header>
  <h1>The Very First Rule of Life</h1>
  <p><time pubdate datetime="2009-10-09T14:28-08:00"></time></p>
    </header>
  <p>If there's a microphone anywhere near you, assume it's hot and sending
  whatever you're saying to the world. Seriously.</p> <p>...</p>
  <section> <h1>Comments</h1>
  <article> <footer>
    <p>Posted by: George Washington</p>
    <p><time pubdate datetime="2009-10-10T19:10-08:00"></time></p>
    </footer>
    <p>Yeah! Especially when talking about your lobbyist friends!</p> </article>
  <article> <footer>
    <p>Posted by: George Hammond</p> <p><time pubdate datetime="2009-10-10T19:15-
    08:00"></time></p> </footer>
    <p>Hey, you have the same first name as me.</p>
  </article> </section> </article>
```

# Video on the Web

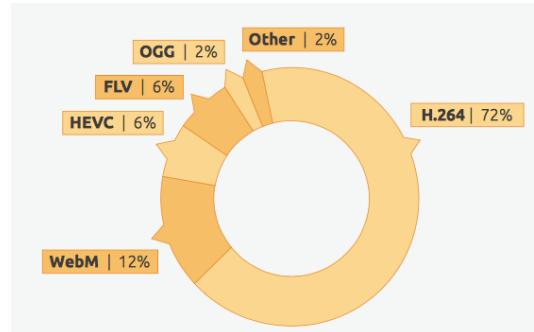
- HTML5 defines a standard way to embed video in a web page, using a <video> element.
- Video container files include video and audio files
- There are lots of competing container files, e.g.
  - MPEG4 compressed video (mp4 or m4v)
  - QuickTime (.mov)
  - Flash Video (.flv) from Adobe
  - Ogg (.ogv) open source
  - WebM (VP8/VP9 video + Vorbis audio), from Google
  - Audio Video Interleave (.avi), invented by Microsoft

# Video Codecs

- There are *lossy* and *lossless* video codecs. Lossless video is much too big to be useful on the web. A *lossy video codec* means that information is being irretrievably lost during encoding.
- Popular video codecs are:
  - MPEG-4 (also known as MPEG4 Part 2)
  - H.264 (also known as MPEG4 Part 10), a.k.a. Advanced Video Coding (AVC)
  - H.265, successor to H.264 (doubles video compression and supports 8K UHD), a.k.a. High Efficiency Video Coding (HEVC) or MPEG-H part 2, used in FaceTime
  - Theora
  - VP8 open source codec, formerly from On2, now Google WebM
  - VP9, successor to VP8 (doubles video compression)
  - Sorenson Spark (H.263 variant) from Adobe
- The H.264 standard is split into “[profiles](#),” defining a set of optional features that trade complexity for file size. Higher profiles use more features, offer better visual quality at smaller file sizes, take longer to encode, and require more CPU power to decode in real-time.
- Apples iPhone 11 supports H.264 video format: playback in 1080p (30 & 60 fps), MPEG4 (30 fps), 4K (24, 30 and 60 fps), also supports H.265 (HEVC) for FaceTime; Apple TV 4K (5<sup>th</sup> gen.) set-top box supports H.264 video up to 2160p (60 fps) and MPEG-4 video (30 fps), Main 10 profile; and Adobe Flash on a desktop PC supports Baseline, Main, and High profiles.
- YouTube uses H.264 to encode HD videos (Google dropped Flash, replaced by HTML5 video).  
<http://www.theverge.com/2015/1/27/7926001/youtube-drops-flash-for-html5-video-default>

# Video Codecs (recent development)

- The H.264 vs. WebM video “war” has ended.
- On March 2012 Firefox CTO “capitulated” and decided to support H.264. See:  
[http://news.cnet.com/8301-30685\\_3-57397031-264/mozilla-execs-capitulate-in-h.264-web-video-war/](http://news.cnet.com/8301-30685_3-57397031-264/mozilla-execs-capitulate-in-h.264-web-video-war/)
- HTML5 / H.264 now supported by YouTube. See:  
<http://www.youtube.com/html5>
- On March 7, 2013, Google admitted its VP8/WebM codec infringes MPEG H.264 patents, and agreed to pay to license H.264 patents, see  
<http://www.businesswire.com/news/home/20130307006192/en/Google-MPEG-LA-Announce-Agreement-Covering-VP8>
- As of January 2016, H.264 reigns supreme, Flash video on life support, see  
<https://www.encoding.com/blog/2016/01/27/h-264-and-hls-reign-in-online-video-finds-encoding-com-report/>
- On July 2017 Adobe system “retired” Flash by end of 2020. See:  
<http://www.scmp.com/tech/enterprises/article/2104092/adobe-systems-retiring-flash-end-2020>



# Audio Codecs

- And like lossless video, lossless audio is really too big to put on the web.
- The *audio codec* specifies how to decode the audio stream and turn it into digital waveforms that your speakers then turn into sound.
- On the web, there are really only three audio codecs you need to know about:
  - MP3
    - MP3s can contain **up to 2 channels** of sound. They can be encoded at different *bitrates*: 64 kbps, 128 kbps, 192 kbps, and a variety of others from 32 to 320. Higher bitrates mean larger file sizes and better quality audio,
  - Advanced Audio Encoding, (AAC and AAC+)
    - It is the default format for Apple's iTunes
    - It supports up to **48 channels** of sound
  - Vorbis
    - Usually comes in an Ogg container
    - Android phones can play Vorbis audio

# HTML MarkUp of Video

- To insert a video file in a web page use the <video> element

```
<video src="pr6.webm" width="320" height="240"></video>
```

- The <video> element has methods like [play\(\)](#) and [pause\(\)](#) and a read/write property called [currentTime](#). There are also read/write [volume](#) and [muted](#) properties.
- you can tell the browser to display a built-in set of controls. To do this, just include the controls attribute in your <video> tag.

```
<video src="pr6.webm" width="320" height="240" controls></video>
```

# Using Attributes preload and autoplay for Video

- The `preload` attribute tells the browser that you would like it to start downloading the video file as soon as the page loads. This makes sense if the entire point of the page is to view the video. On the other hand, if it's just supplementary material that only a few visitors will watch, then you can set `preload` to `none` to tell the browser to minimize network traffic.
- Here's an example of a video that will start downloading (but not playing) as soon as the page loads:

```
<video src="pr6.webm" width="320" height="240" preload></video>
```

- And here's an example of a video that will *not* start downloading as soon as the page loads:

```
<video src="pr6.webm" width="320" height="240" preload="none"></video>
```

- The `autoplay` attribute tells the browser that you would like it to start downloading the video file as soon as the page loads, *and* you would like it to start playing the video automatically as soon as possible.
- Here's an example of a video that will start downloading and playing as soon as possible after the page loads:

```
<video src="pr6.webm" width="320" height="240" autoplay></video>
```

# HTML5 Video Example

[http://www.w3schools.com/html/tryit.asp?filename=tryhtml5\\_video\\_all](http://www.w3schools.com/html/tryit.asp?filename=tryhtml5_video_all)

The screenshot shows a web browser window titled "Tryit Editor v1.6". The address bar displays the URL: "www.w3schools.com/html/tryit.asp?filename=tryhtml5\_video\_all". The page content includes an orange sidebar with "Get Certified" and "Study Web Technologies and get a diploma at w3schools.com". A banner for "QlikView BI Dashboard" from QlikView.com/Big\_Data is present. The main area is split into two sections: "Source Code:" and "Result:". The "Source Code:" section contains the following HTML5 code:

```
<!DOCTYPE html>
<html>
<body>

<video width="320" height="240" controls>
  <source src="movie.mp4"
  type="video/mp4">
  <source src="movie.ogv"
  type="video/ogg">
    Your browser does not support the video
tag.
</video>

</body>
</html>
```

The "Result:" section displays a video player showing a brown bear sitting in water near some birds. The video player has a play button, a progress bar showing 0:12, a volume icon, and a full-screen icon.

# Video Attributes

The screenshot shows a web browser window with four tabs open: "html5 tutorial - ...", "HTML 5 Tutorial", "HTML5 Video", and "Tryit Editor v1.4". The main content area displays a table titled "All <video> Attributes".

Attribute	Value	Description
autoplay	autoplay	Specifies that the video will start playing as soon as it is ready
controls	controls	Specifies that controls will be displayed, such as a play button.
height	<i>pixels</i>	Specifies the height of the video player
loop	loop	Specifies that the media file will start over again, every time it is finished.
preload	preload	Specifies that the video will be loaded at page load, and ready to run. Ignored if "autoplay" is present.
src	<i>url</i>	Specifies that the URL of the video to play
width	<i>pixels</i>	Specifies the width of the video player

# Audio

The screenshot shows a web browser window titled "HTML5 Audio" with the URL "www.w3schools.com/html/html5\_audio.asp". The page displays a table titled "Audio Formats and Browser Support" comparing three file formats (MP3, Wav, Ogg) across five browsers: Internet Explorer 9+, Chrome 6+, Firefox 3.6+, Safari 5+, and Opera 10+. The table indicates that MP3 is supported by all browsers, Wav is supported by Chrome, Firefox, and Opera, and Ogg is supported by Chrome, Firefox, and Opera.

Browser	MP3	Wav	Ogg
Internet Explorer 9+	YES	NO	NO
Chrome 6+	YES	YES	YES
Firefox 3.6+	NO	YES	YES
Safari 5+	YES	YES	NO
Opera 10+	NO	YES	YES

The screenshot shows a web browser window titled "HTML5 Audio" with the URL "www.w3schools.com/html/tryit.asp?filename=tryhtml5\_audio\_all". It uses the "Tryit Editor v1.6" interface. On the left, the "Source Code:" panel contains the following HTML code:

```
<!DOCTYPE html>
<html>
<body>

<audio controls>
  <source src="horse.ogg" type="audio/ogg">
  <source src="horse.mp3" type="audio/mpeg">
  Your browser does not support the audio element.
</audio>

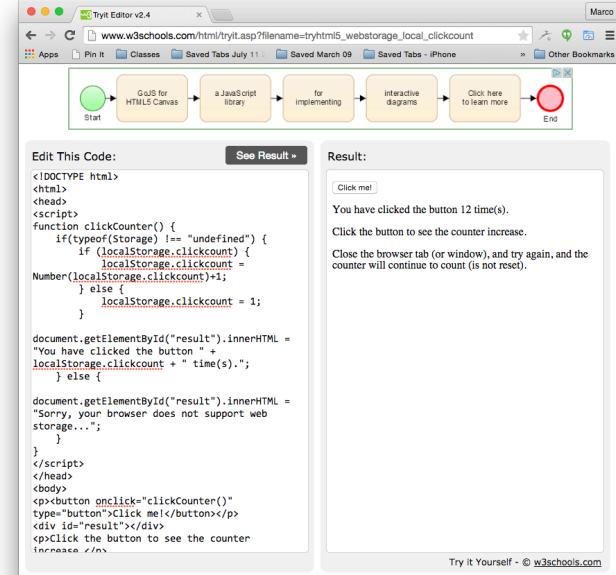
</body>
</html>
```

On the right, the "Result:" panel shows a media player control with a play button, a progress bar at 0:01, and a volume slider. The text "Your browser does not support the audio element." is displayed below the media player.

# localStorage

- localStorage is a client-side key-value database,
  - data is stored in the users browser and remains there **even across sessions** (open/close browser)
  - data is only available when on that machine and in that browser.
  - localStorage is per browser not per computer.
  - localStorage only supports storing of strings
- Below is an example of local storage that counts the number of clicks on a button

```
<!DOCTYPE html>
<html>
<head>
<script>
function clickCounter() {
    if(typeof(Storage) !== "undefined") {
        if (localStorage.clickcount) {
            localStorage.clickcount = Number(localStorage.clickcount)+1;
        } else {
            localStorage.clickcount = 1;
        }
        document.getElementById("result").innerHTML = "You have clicked the button " +
        localStorage.clickcount + " time(s).";
    } else {
        document.getElementById("result").innerHTML = "Sorry, your
        browser does not support web storage...";}
    }
}</script>
</head>
<body>
<p><button onclick="clickCounter()" type="button">Click me!</button></p>
<div id="result"></div>
<p>Click the button to see the counter increase.</p><p>Close the browser tab (or window), and try again, and the counter will continue to count (is not
reset).</p></body></html>
```



See: [http://www.w3schools.com/html/tryit.asp?filename=tryhtml5\\_webstorage\\_local\\_clickcount](http://www.w3schools.com/html/tryit.asp?filename=tryhtml5_webstorage_local_clickcount)

# Session Storage

- Session storage is designed for scenarios where the user is carrying out a single transaction, but could be carrying out multiple transactions in different windows at the same time.
- To address this, this specification introduces the sessionStorage IDL attribute (An IDL attribute determines the behavior of script data). Sites can add data to the session storage, and *it will be accessible to any page from the same site opened in that window. The sessionStorage object is equal to the localStorage object, except that it stores the data for only one session. The data is deleted when the user closes the specific browser tab.*
- For example, a page could have a checkbox that the user ticks to indicate that he wants insurance:

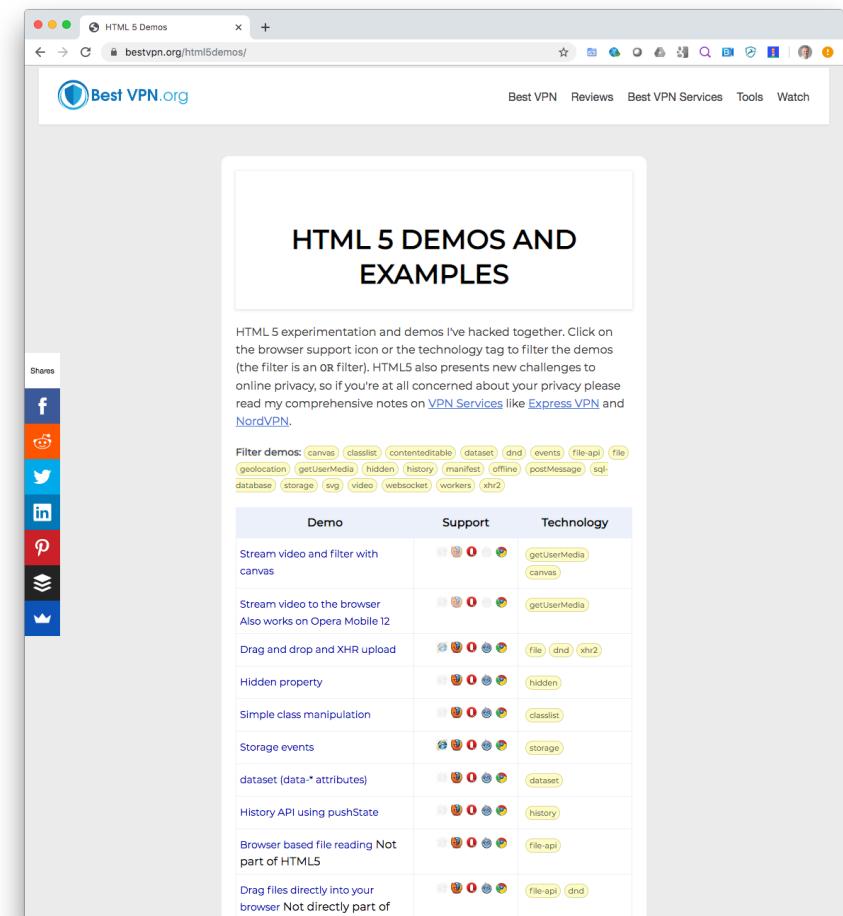
```
<label>  
<input type="checkbox" onchange="sessionStorage.insurance =  
checked ? 'true' : ''">  
I want insurance on this trip.</label>
```

- A later page could then check, from script, whether the user had checked the checkbox or not:  

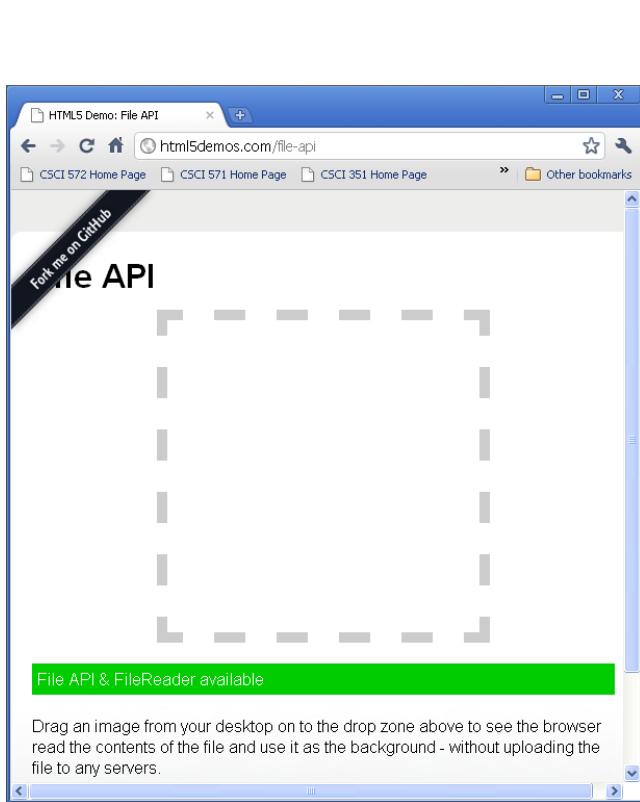
```
if (sessionStorage.insurance) { ... }
```
- If the user had multiple windows opened on the site, each one would have its own individual copy of the session storage object.

# View Some New HTML5 Capabilities

- Go to <https://bestvpn.org/html5demos/> and select your favorite browser, e.g. Firefox, and try these examples:
  - Drag files directly into your browser
    - Try it with an image
  - Interactive canvas gradients
    - Move mouse across gradient
  - Then View Source
  - Content editable
    - Edit some text and then restore
  - Geolocation
    - Try it
- More significant examples of content editable and geolocation can be found at  
<https://csci571.com/examples.html#html5>



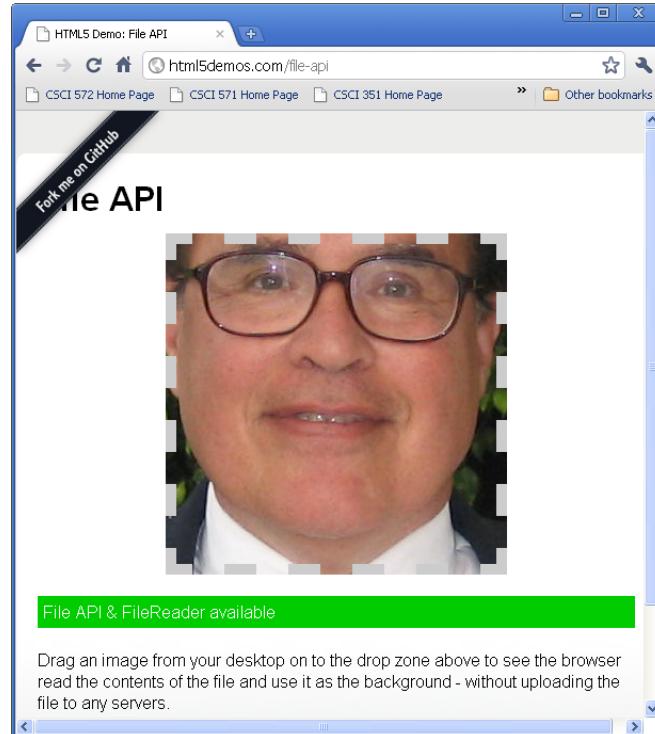
# Drag an Image from Desktop to drop Zone



Before

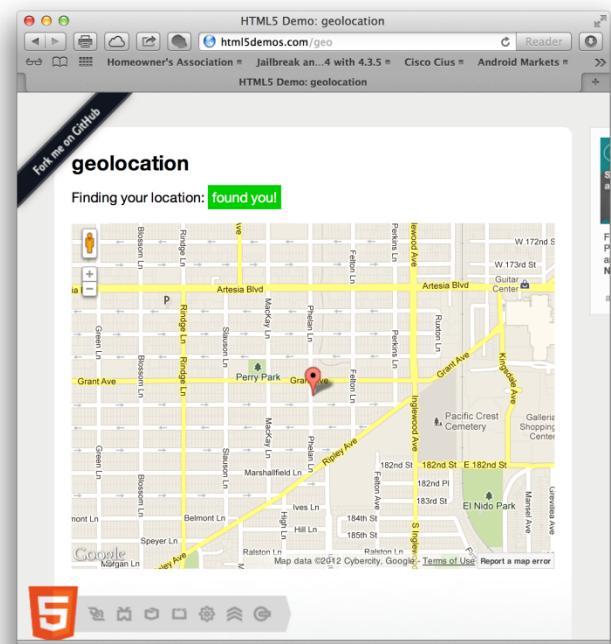
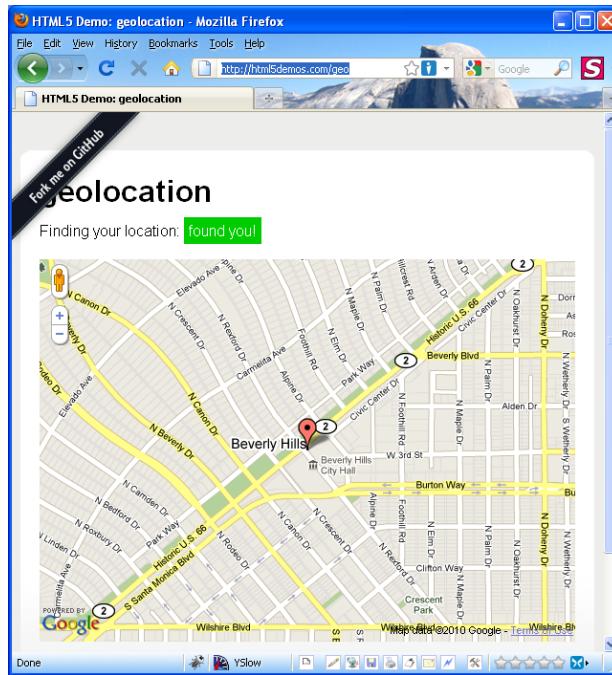
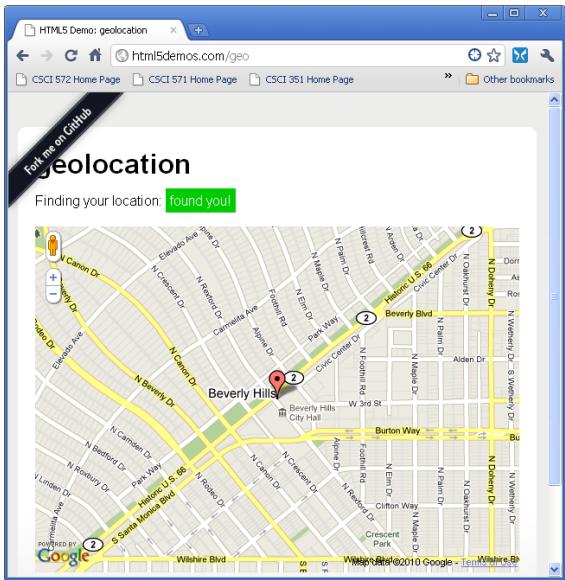


Image



After

# Geolocation Example



Chrome

Firefox

Safari

# Apple support for HTML5

Safari

Tools Features Extensions Preview Resources Download

## Features in Safari

CSS HTML JavaScript Graphics and Text Accessibility More

### CSS

#### CSS Variables

Now it's possible to assign values to custom CSS variables, so you can more easily manage complex CSS systems and reduce the amount of duplicated code.

#### CSS Initial Letter

Initial letter CSS improves usability and creates visual interest by adding a visual marker to the beginning of new sections of content.

#### CSS Backdrop Filters

Backdrop filters allows webpages to easily create visual layering that adds a sense of depth, while preventing details in the content underneath, even videos, from cluttering the foreground content.

#### CSS Shapes and Compositing

Using CSS, websites can now easily flow text around images and geometry shapes, and perform image compositing operations on DOM elements.

#### CSS Regions

Safari supports complex, magazine-like layouts for webpages. CSS Regions allow content in complex layouts to flow within different regions and still be associated.

#### CSS Scroll Snapping

Scroll snapping with CSS allows web pages to smoothly end user scrolling with content elements always perfectly aligned in the view.

#### CSS4 Pseudo-classes

New CSS4 pseudo-classes make it easier than ever to apply styles to any link, based on the current language, a numbered element, or when an input placeholder is shown. Powerful new matching and not-matching pseudo-classes help simplify style code to make it easier to maintain web sites.

#### CSS Effects

Pioneered by Safari, CSS effects help developers add polish to websites by stylizing images and photos with eye-catching gradients, precise masks, and stunning reflections that require only a few lines of code.

#### CSS3 Web Fonts

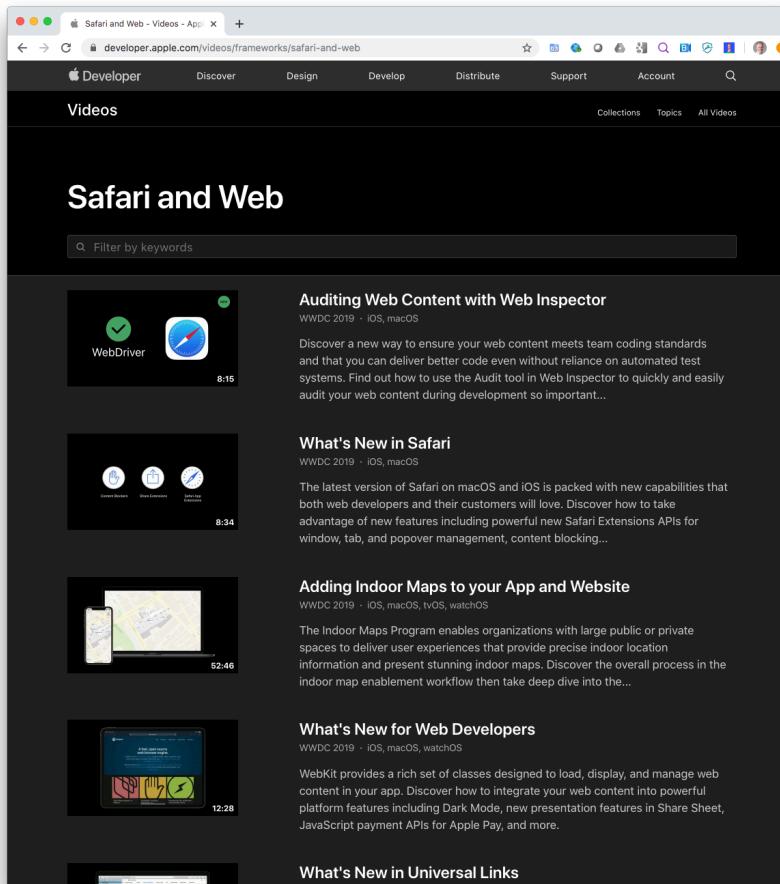
CSS3 web fonts allow web designers to create stunning websites using the fonts they prefer rather than restricting themselves to "web-safe fonts." Safari was the first web browser to automatically recognize websites that use custom fonts, downloading them as they're needed.

<https://developer.apple.com/safari/features/>

# Some Other HTML5 Video Examples

- A good HTML5 Audio and Video guide is available at:

[http://developer.apple.com/library/safari/#documentation/AudioVideo/Conceptual/Using\\_HTML5\\_Audio\\_Video/Introduction/Introduction.html](http://developer.apple.com/library/safari/#documentation/AudioVideo/Conceptual/Using_HTML5_Audio_Video/Introduction/Introduction.html)



# HTML5 Also Introduces Many New APIs

<http://alebelcor.blogspot.com/2011/10/html5-apis.html>

and

<http://www.netmagazine.com/features/developer-s-guide-html5-apis>

The screenshot shows a Mozilla Firefox window with the title bar "HTML5 APIs - Mozilla Firefox". The address bar contains "alebelcor.blogspot.com/2011/10/html5-apis.html". The main content area displays a blog post with the following sections:

- HTML5 APIs**: A brief introduction stating that HTML5 introduces new APIs.
- Application Cache API**: Describes it as an API to interact with the application cache, which is a set of cached resources. It mentions that you can use `window.applicationCache` to get the `ApplicationCache` object.
- DataTransfer API**: Explains that `DataTransfer` objects are used to expose the drag data store that underlies a drag-and-drop operation.
- Command API**: Describes a command as an abstraction behind menu items, buttons, and links.
- Constraint Validation API**: Notes that there is no proper definition of this API at the time of writing.
- History API**: States that History objects provide a representation of the pages in the session history of browsing contexts.
- MediaController API**: Allows interaction with `<audio>` and `<video>` elements.
- TextTrack API**: Allows interaction with `<audio>` and `<video>` associated text tracks.

The screenshot shows a web browser displaying the ".NET Magazine" website. The URL in the address bar is "www.netmagazine.com/features/developer-s-guide-html5-apis". The page title is "The developer's guide to the HTML5 APIs | Feature | .NET magazine". The main content features the heading "The developer's guide to the HTML5 APIs" and several large icons representing different HTML5 features: a stylized '5' for HTML5, a play button for video, a cube for 3D, and a person icon. Below the heading is a bio for Rich Clark and a summary of the article. To the right, there is a sidebar for "THE LATEST ISSUE ON SALE NOW!" and a "TRENDING POSTS" section.

# HTML5 Logo



<http://www.w3.org/html/logo/>

# More Articles on the Flash vs HTML5 Controversy

- Adobe to More Aggressively Contribute to HTML5

<http://blogs.adobe.com/flashplatform/2011/11/flash-to-focus-on-pc-browsing-and-mobile-apps-adobe-to-more-aggressively-contribute-to-html5.html>

- Comparison of speed of Flash and HTML5

[http://www.appleinsider.com/articles/10/03/10/flash\\_html\\_5\\_comparison\\_finds\\_neither\\_has\\_performance\\_advantage.html](http://www.appleinsider.com/articles/10/03/10/flash_html_5_comparison_finds_neither_has_performance_advantage.html)

- SproutCore:

[http://www.appleinsider.com/articles/10/04/19/sproutcore\\_debuts\\_new\\_html5\\_web\\_development\\_tools.html](http://www.appleinsider.com/articles/10/04/19/sproutcore_debuts_new_html5_web_development_tools.html)

<https://sproutcore.com/>

# More HTML5 fun....

- <http://www.chromeexperiments.com/>
- <http://www.creativebloq.com/web-design/examples-of-html-1233547>
- <https://www.noupe.com/essentials/freebies-tools-templates/40-beautiful-free-html5-css3-templates.html>
- <http://html5gallery.com>
- <https://www.juicebox.net/demos/>
- <http://wowslider.com/html5-gallery-puzzle-collage-demo.html>

video element:

<https://html.spec.whatwg.org/#video>

- audio element:

<https://html.spec.whatwg.org/#audio>