HTML5

T-110.5121
Mobile Cloud Computing
17.10.2012

HTML

- *HTML is a Markup Language for creating Web pages.*
- *HTML was primarily designed as a language for semantically describing scientific documents, although its general design and adaptations over the years have enabled it to be used to describe a number of other types of documents.*
- *HTML uses markup tags to create Web pages. All content on the Web page is meant by tag. For examples, "Here is a paragraph", "This is a image" and so on.*

```
<!doctype html>
<html lang="en">
<head>
  <title>Sample Web page</title>
</head>
<body>
  <p>Here is a paragraph</p>
</body>
```

http://www.w3.org/wiki/HTML/Training/What_is_HTML
http://www.w3.org/TR/html5/introduction.html#history-1

Brief History of HTML(5)

Version	Published Year
HTML+	1993
HTML2.0	1995
HTML3.2	1997
HTML4.01	1999
XHTML1.1	2001
HTML5 (Working Draft)	2008
HTML5 (Last Call)	2011
HTML5 (Recommendation)	*2014*

- W3C had been working on something called *Web Forms 2.0* since 2004
- WHATWG, founded in 2004, is another standards body that begun work on another standard, *Web Applications 1.0* in 2005
- The two standards were combined in 2007 to form the starting point for *HTML5*

http://www.w3.org/TR/html5/introduction.html#history-1
http://wiki.whatwg.org/wiki/FAQ#The_WHATWG
http://www.whatwg.org/specs/web-apps/2005-09-01/

The Two Groups

- The **W3C** HTML5 draft states:

  "*The main area that has not been adequately addressed by HTML is a vague subject referred to as Web Applications. This specification attempts to rectify this, while at the same time updating the HTML specifications to address issues raised in the past few years.*"

- The **WHATWG** FAQ states something quite similar with the big difference that:

  *"Going forward, the WHATWG is just working on "HTML", without worrying about version numbers. When people talk about HTML5 in the context of the WHATWG, they usually mean just "t**he latest work on HTML**", not necessarily a specific version."*

http://www.w3.org/TR/html5/introduction.html#history-1
http://wiki.whatwg.org/wiki/FAQ#The_WHATWG

Why HTML5

- The web hasn't been just text and pictures for a while now. There's a lot more going on in front of and behind the UI then before.
- Applications and multimedia (i.e. video/audio) require more than was available with HTML4.01 or XHTML1.1.
- Browser plug-ins like Flash, Shockwave, Java(FX), Silverlight and others filled that gap.
- Unfortunately those plug-ins tended to introduce new problems, security issues being one of the worst.

Java Vulnerability Affects 1 Billion Plug-ins

Another week, another Java vulnerability--only this one affects all versions of Java released in the past eight years.

By Mathew J. Schwartz | InformationWeek
September 26, 2012 11:06 AM

Anyone still using a Java plug-in in their Web browser, beware: Another major, new--and as yet unpatched--vulnerability has been spotted in Java.

Unfortunately, unlike a number of the other, recently spotted Java bugs, the latest security issue affects not just the current, version 7 of Java, but also versions 5 and 6. In other words, every version of Java released for the past eight years, collectively used by approximately one billion people, is vulnerable to the exploit.

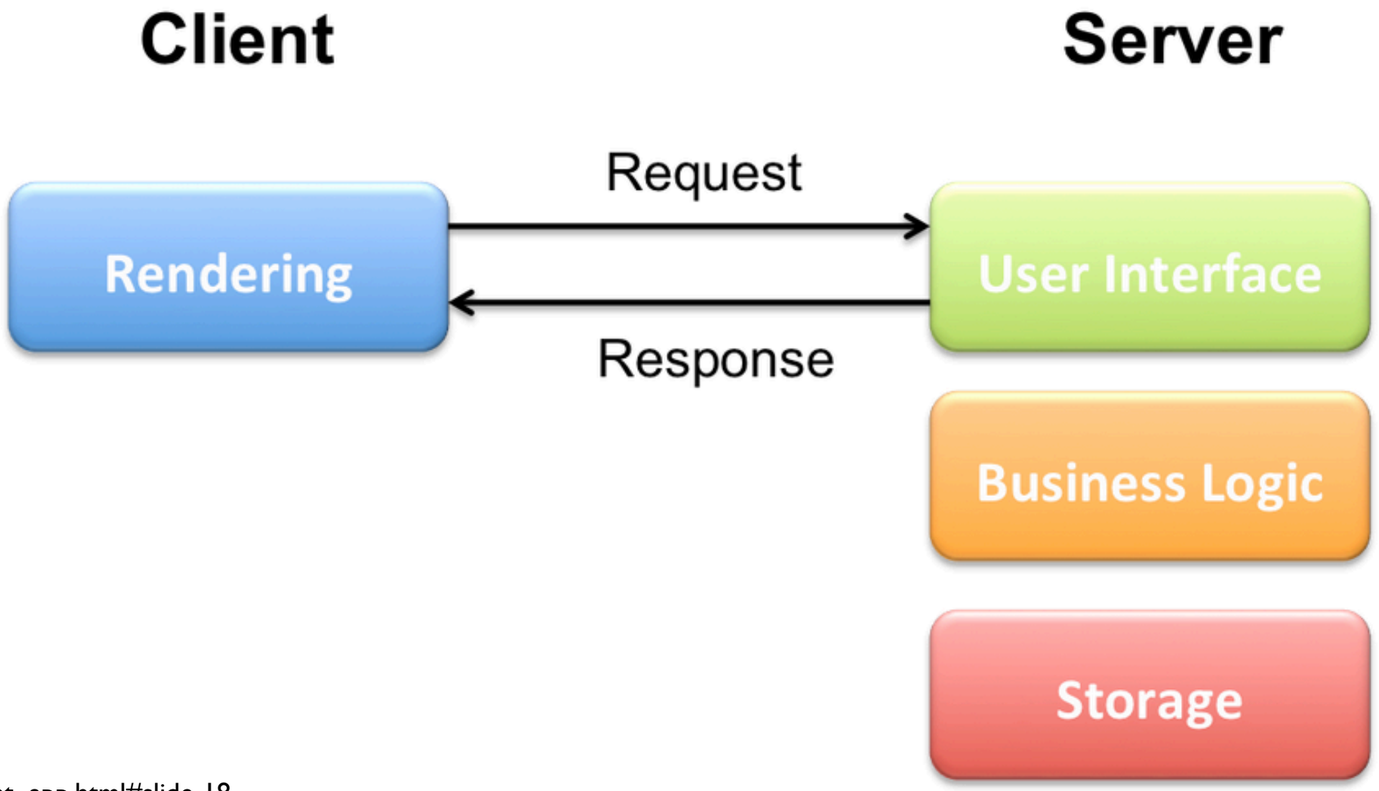
Another month, another critical Flash security update

By Geoff Duncan | Digital Trends – Tue, Mar 6, 2012

https://www.informationweek.com/security/application-security/java-vulnerability-affects-1-billion-plu/240007985
http://news.yahoo.com/another-month-another-critical-flash-security-182409393.html

Why HTML5

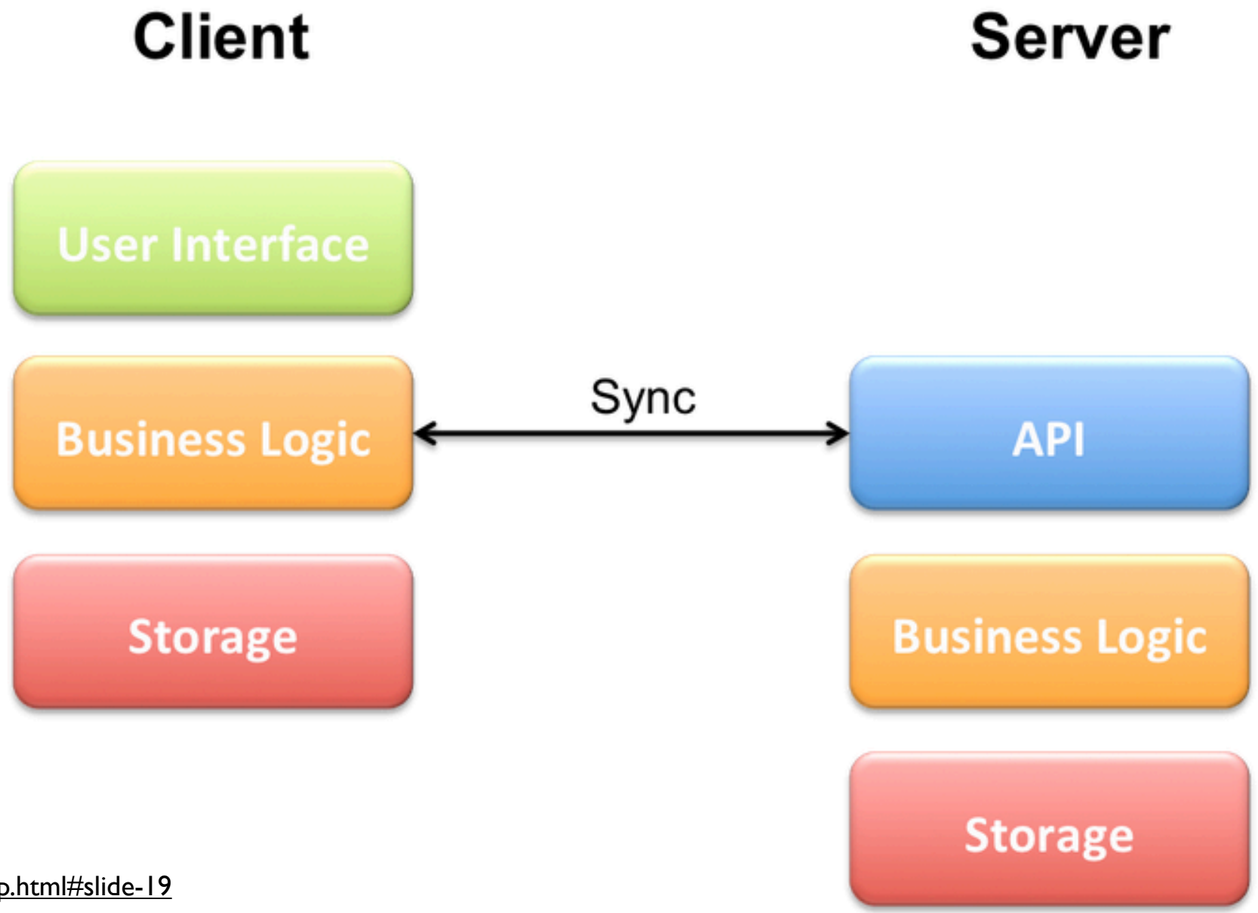
- In short, we are moving from this:



http://aaltowebapps.com/lesson_net_app.html#slide-18

Why HTML5

- To this:



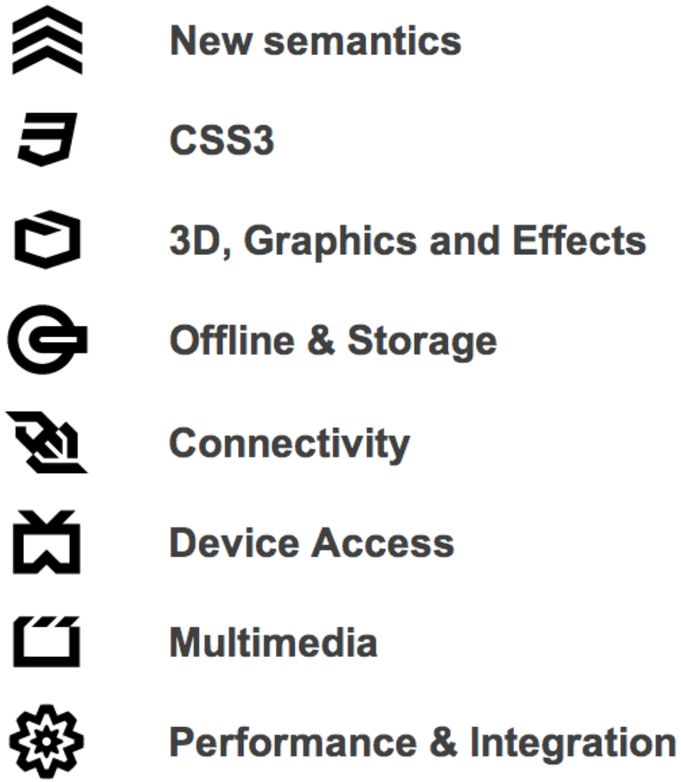
http://aaltowebapps.com/lesson_net_app.html#slide-19

What is HTML5

- To put it simply, its about web applications and multimedia. The browser ~ *the new desktop*.
- HTML5 actually consists of three parts: **HTML5**, **CSS3** and **JavaScript**.
- HTML5 describes what the page contains, CSS3 describes how the page should look and JavaScript takes care of how the page operates.
- Even though the HTML5 specification isn't "ready" yet, it is being marketed with an impressive list of benefits. Easier and faster development; Better security; Device agnosticism etc.
- Though web development has in the past been easier then traditional software development, the complexity of web applications is increasing.

http://www.html5rocks.com/en/why
http://slides.html5rocks.com/#landing-slide
http://aaltowebapps.com/lesson_net_app.html -- Two good slide sets, check them out!

What is HTML5



- What are the libraries and APIs, ~features you need to do a *traditional* program?
- HTML5 brings some of those features to the browser, there are examples coming up...
- **Fun Fact:** The WHATWG HTML standard document is around 500 pages, while W3C's HTML4.01 was around 300 pages.

http://www.whatwg.org/specs/web-apps/current-work/
http://www.w3.org/TR/html5/

Wait… What About Flash

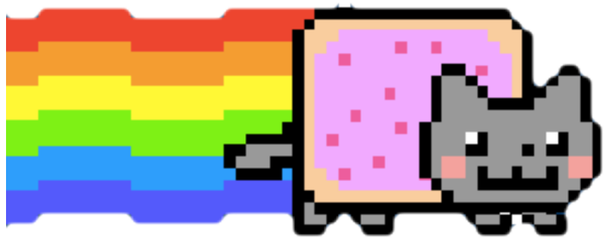
- Not a simple matter --
  Apples and Oranges
- HTML5 describes how a website appears, Flash is an element within that page.
- Video playback performance of Flash on desktops, especially on Windows, is usually better than HTML5.
- Flash offers almost all of HTML5 and other important features currently absent from it. Penetration of Flash on mainstream browsers is around 99%, for example it's integrated into Google Chrome.
- *Why switch?* In some cases you have to, in some cases you don't.

http://www.techrepublic.com/blog/webmaster/html5-vs-flash-the-state-of-the-debate/1556
http://www.forbes.com/sites/fredcavazza/2011/07/17/why-opposing-html5-and-flash-is-a-non-sense/

Wait… What About Flash

- Flash is Adobe's -- HTML5 is open
- Flash for iOS and Android -- it was either missing from the beginning or being phased out.
- PhoneGap -- Even Adobe is embracing HTML5 on the mobile side.
- The mobile markets have abandoned Flash, but what about the desktop?

- According to Adobe, Flash and the desktop alternative AIR are aiming for "rich motion graphics" and gaming. For example, Flash based video can provide DRM and more advanced interface/streaming features.



* Incidentally, also available in HTML5

https://www.adobe.com/content/dam/Adobe/en/devnet/flashplatform/whitepapers/flash-runtimes-roadmap.pdf
http://phonegap.com/

Desktop Browser Support

- http://html5test.com/ -- Test your own browser
- http://html5test.com/results/desktop.html
- http://caniuse.com/
- http://www.findmebyip.com/litmus/
- http://html5readiness.com/

HTML5 on Mobile Devices

http://mobilehtml5.org/

http://slides.html5rocks.com/#slide-orientation

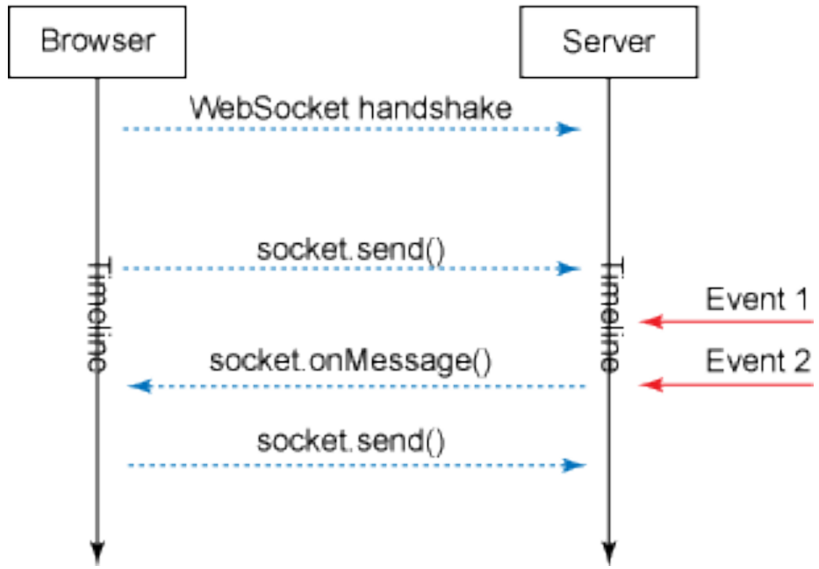
HTML5 on Mobile Devices

- Native applications or web applications, the big issue. We'll stick to the broader strokes.
- HTML5 on the mobile side is geared to provide a good alternative to a native application in as many devices as possible.
- Try comparing for example your mobile devices native Facebook app and https://m.facebook.com
- If the mobile browser support is there and its performance is acceptable, HTML5 can challenge certain types of mobile applications.
- Which option do you think most developers would prefer?
  To develop for:
  A) X number of platforms
  B) X number of browsers?

HTML5 Features

Connectivity

- **WebSocket**: Two-way communication over between client and host over a single connection instead of multiple HTTP connections.
- Message stream instead of a byte stream when compared to a traditional TCP socket.
- Improves the data transfer efficiency of HTML5 applications.



http://www.whatwg.org/specs/web-socket-protocol/
http://www.ibm.com/developerworks/web/library/wa-reverseajax2/index.html

Example: http://slides.html5rocks.com/#web-sockets

Connectivity

- **WebWorker**: *“An API for running scripts in the background independently of any user interface scripts.”**
- High starting and memory costs, but they’re meant to be long-lived. They do stuff in the background without disturbing the UI.

- Example Use Cases:**
  - Prefetching and/or caching data for later use
  - Code syntax highlighting or other real-time text formatting
  - Spell checker
  - Analyzing video or audio data
  - Background I/O or polling of webservices
  - Processing large arrays or humungous JSON responses
  - Image filtering in <canvas>
  - Updating many rows of a local web database

* http://www.whatwg.org/specs/web-apps/current-work/multipage/workers.html
** http://www.html5rocks.com/en/tutorials/workers/basics/

Example: http://slides.html5rocks.com/#web-workers

Connectivity

- **Notifications**: Shows the user a notification or an alert when a predefined event occurs (incoming E-mail, name mentioned in Twitter or IRC etc.)
- **Server Sent Events**: Allows web servers to push data to the client/ browser, same idea as notifications, but instead of an alert, the content can be much more substantial.
- **Web Intents**: Defines what should be done when a certain type of action is performed, for example when receiving and image, opening it in an image viewer or editor.
- **WebRTC**: Communication between server-client and client-client, even through NATs. Included both multimedia streams or arbitrary data.

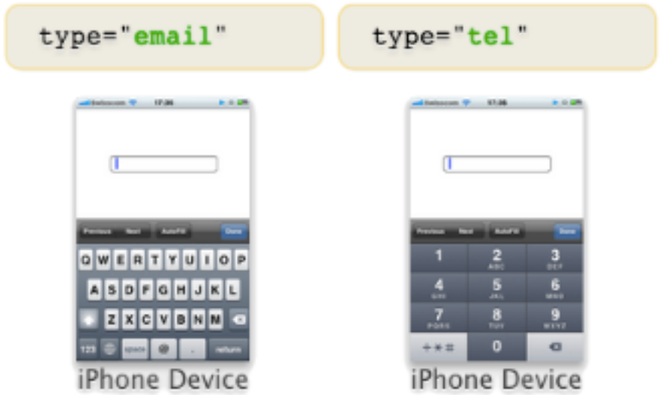
http://www.w3.org/TR/notifications/
http://www.w3.org/TR/eventsource/
http://www.w3.org/TR/web-intents/
http://www.w3.org/TR/webrtc/

Example: http://slides.html5rocks.com/#notifications-api

Semantics

- **Semantics**: Loads new semantic tags, form types, “Microdata” and better mobile support for form fields.
- Tags such as <header>, <nav>, <figure>, <footer> etc.
- Form types such as required, email, date, range etc.

- Microdata allows you to define your own vocabulary/tags, or to use a predefined one for your page.
- Mobile support for form fields equates to opening the right type of UI for a specific type of field.



http://slides.html5rocks.com/#semantics-markup-title
http://www.whatwg.org/specs/web-apps/current-work/multipage/microdata.html

Example: http://slides.html5rocks.com/#semantics-markup-title

Offline & Storage

- **Offline & Storage**: Data can be stored on the client/browser side, either per session or “permanently”.
- Three types:
  Web Storage -> Simple key-value
  IndexedDB -> Indexed key-value
  Web SQL *-> Essentially: sqlite*

- Web Storage is just as the name says, no database related features.
- IndexedDB is more like a lite-version of a NoSQL database, see the source link for the full details.
- W3C and WHATWG have dropped Web SQL from their standards, though it is supported on some browser natively or with add-ons.

http://www.w3.org/TR/webstorage/
http://www.w3.org/TR/IndexedDB/
http://www.w3.org/TR/webdatabase/
https://developer.mozilla.org/en-US/docs/IndexedDB/Basic_Concepts_Behind_IndexedDB

Example: http://slides.html5rocks.com/#offline-storage-title

Device Access

- **Geolocation**: Location data from the device. Is source agnostic, so the data could be from GPS, GLONASS, Galileo, WiFi, Bluetooth, MAC, RFID etc.
- **Screen Orientation**: Tells you the screens orientation and when it changed, see the previous example on your mobile device.
- **Media Capture**: Informs the client of the “preferred means” of capture of the soon to be transferred media. For example, does the host want/prefer images from a file or from the camera?
- **Speech Recognition**: The standard is still being worked out, works with Google Chrome at the moment.

http://www.w3.org/TR/geolocation-API/
http://www.w3.org/TR/screen-orientation/
http://www.w3.org/TR/html-media-capture/
http://www.w3.org/2005/Incubator/htmlspeech/XGR-htmlspeech-20111206/

Example: http://slides.html5rocks.com/#speech-input

File API

- For storing files and information not well suited for Web Storage or any of the database solutions, i.e. Larger files or files you want to share with other programs.
- Has both synchronous (no callbacks, simpler to work with) and asynchronous filesystem access.
- The UI file access apparently only works with the asynchronous access, but Web Workers work with both.
- Using Web Workers and the File API provide a simple way for web applications to manipulate the local filesystem.
- **Desktop Drag-In & Drag-Out**: UI feature that allows you to drag&drop files from the browser and to the browser

http://www.w3.org/TR/file-system-api/
http://www.html5rocks.com/en/tutorials/file/filesystem-sync/

Example: http://slides.html5rocks.com/#drag-and-drop

Multimedia

- HTML5 has <video> and <audio> tags for in-browser video and audio playback.
- Unfortunately most browser only support a subset of codecs or require additional packages to be installed for support.

http://www.w3schools.com/html/html5_video.asp
https://en.wikipedia.org/wiki/HTML5_video

Example: http://slides.html5rocks.com/#video-audio

HTML5 Browser/Codec

Browser	Operating system	Latest stable release	Video formats supported		
			Theora	H.264	VP8 (WebM)
Android browser	Android	4.1.2 "Jelly Bean" (October 9, 2012; 6 days ago)[27][28]	2.3[29]	3.0[29]	2.3[29]
Chromium	All supported	N/A	r18297[30]	Manual install[note 1]	r47759[32]
Google Chrome	All supported	22.0.1229.94 (October 10, 2012; 5 days ago)	3.0[33][34]	3.0[34][note 2]	6.0[36][37]
Internet Explorer	Windows	9.0.10 (September 21, 2012; 24 days ago)	Manual install[note 3]	9.0[39]	Manual install[note 4]
	Windows Phone	9.0 (February 14, 2011; 19 months ago)	No[*citation needed*]	9.0[*citation needed*]	No[*citation needed*]
Konqueror	All supported	4.9.2 (2 October 2012; 13 days ago)[42]	4.4[note 5]		
Mozilla Firefox	All supported	16.0.1 (October 11, 2012; 4 days ago)[44]	3.5[45]	No[note 6][note 7]	4.0[48][49]
Opera	All supported	12.02 (August 30, 2012; 46 days ago)	10.50[50]	No	10.60[51][52]
Safari	iOS	6.0 (July 25, 2012; 2 months ago)	No	3.1[53][54]	No
	MacOS X		Manual install[note 8]		Manual install[55]
	Windows	5.1.7		Manual install[56]	
Web (previously **Epiphany**)	All supported	3.6 (September 26, 2012; 19 days ago)[57]	2.28[note 9]		

https://en.wikipedia.org/wiki/HTML5_video -- Viewed 16.10.2012

Graphics and CSS3

- Quite a few things.
- Instead of listing them all, I'll just point you to these example slides from HTML5Rocks:
- http://slides.html5rocks.com/#graphics-multimedia-title
- http://slides.html5rocks.com/#css3-title

Example: http://slides.html5rocks.com/#canvas-2d-example

WebGL

- 3D Graphics in the browser
- Not officially a part of the HTML5 specification, but maintained by the Khronos Group.
- http://media.tojicode.com/q3bsp/
- http://www.webgl.com/category/webgl-games/
- http://www.playmapscube.com/

https://www.khronos.org/webgl/

Example: http://slides.html5rocks.com/#canvas-3d

HTML Next

- The HTML5 standard by W3C is targeted to move from the “Last Call” phase to the “Recommendation” phase in 2014.

- WHATWG is working with a living HTML standard that’s constantly changing, so its much the same to them, but W3C is planning on something called HTML Next.

- You can take a look at the proposed new features at:
  http://www.w3.org/wiki/HTML/next
  http://www.w3.org/html/wg/next/markup/

- The new features include: A **data-** element that is machine and human readable, for both background processing and page rendering purposes. Another example is UI control with a speech recognition element called **reco**.