Adobe Flash vs. HTML5 Development Tools for Business Success

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In this paper, we'll examine the Adobe Flash and HTML5 platforms for creating rich Internet applications, and provide guidelines for when to choose each.

Now more than ever, interactive marketing content drives consumer attraction, engagement and sales conversion online.

Due to varying market share and browser support, the answers may not be as easy as we think… and especially during a market transition showing increasing traffic on mobile devices, this can be a critical decision for your business.

Adobe Flash

Flash emerged in 1996 as a plug-in for animated graphics and quickly became the dominant and default delivery platform for rich Internet applications (RIAs), including video streaming.

Creating Flash apps: Flash applications for the Web are typically authored by importing media assets like images, audio and video clips into the Flash Professional environment (IDE), scripted using the ActionScript language and delivered to the browser within compiled .SWF files (pronounced "swiff").

Flash functionality is consistent across browsers. Features are updated simultaneously across all platforms when new versions of the Flash Player plug-in are released by Adobe.

Performance: Apps running in older versions of Flash sometimes caused high CPU utilization; however, since Flash 10.1 added graphics hardware acceleration support, utilization was lowered and is generally on par with HTML5. Flash is still popular for very high performance applications like games and complex animation.

HTML5

HTML5 typically refers to a stack of related Web standards and extensions used for interactive apps:

- The 5th version of the Hypertext Markup Language (HTML), the basic standard for Web pages containing content such as text, images, and hyperlinks

- CSS3 (cascading style sheets, version 3) for defining presentation styles and look-and-feel – layout, colors, fonts, background images, etc.

- Javascript, the scripting language which enables small interactive programs (functions) to run within the browser

- jQuery or other Javascript frameworks such as Mootools or prototype.js; these are not strictly part of the HTML5 standard, but are popular for handling animation effects, dynamic data, etc.

- Canvas elements now allow browsers to create 2D raster (bitmapped) graphics objects

Creating HTML5 apps: HTML5 "apps" are typically authored with widely used code editors and tools. Unlike the Flash .SWF format, multiple file assets remain separate. Because HTML5 assets are interpreted in the browser at run-time, no pre-compiling is necessary.

Unlike Flash which is controlled by a single entity, HTML5 features depend on browser manufacturers' ability to implement its still-developing standards; as a result, support varies across Web browsers. Notably, Microsoft Internet Explorer has lagged behind competitors, with partial HTML5 support starting with IE9 (released 3/2011). Also, some mobile browsers lag behind in support for HTML5's animation and socket connection features.

Playing video: Due to patent licensing concerns, the dominant video file format (H.264) remains unsupported in Firefox, and Google has also threatened to remove H.264 support from its popular Chrome browser, although no sunset date has been given. (H.264 licensing fees are expected to arrive in 2016.)

Platform capabilities at a glance

Here is a high-level comparison of rich media features provided by Adobe Flash Player (ActionScript 3) vs. HTML5 as implemented in popular desktop browsers:

	Flash	HTML5
Active adoption since	1998	2008
Engine type	Browser plug-in	Browser native*
Standardization	De facto standard; proprietary spec managed by Adobe	Open standard; managed by W3C consortium working group
2D bitmap/raster images	Yes	Yes, IE 9+* (Canvas)
Transform/filter 2D images	Yes	Limited*
2D vector images	Yes (SWF, EPS, SVG)	Yes, IE 9+* (SVG)
3D hardware acceleration	Yes	Limited (WebGL)
Streaming video	Yes (FLV, H.264)	Yes, IE 9+* (H.264)
Multi-touch	Yes; varies by browser	Preliminary; varies by browser
Drag-and-drop	Yes	Yes, IE 9+*
Geolocation access	No	Yes, if user approves
Camera/microphone access	Yes, if user approves	Limited
Custom Web fonts	Yes (embedded, sIFR)	Yes, IE 9+ (WOFF, Cufón)
Native input type validation	No	Preliminary, IE 10+*
Offline mode	Separate app (Adobe AIR)	Preliminary, IE 10+*
Search engine optimizable	Limited	Yes
Universal Web accessibility	Very limited	Yes
Digital rights management	Yes	Limited; depends on video codec
Primary scripting language	ActionScript	Javascript
Per-visitor royalties	None	None
Authoring tools	Adobe Flash Professional IDE: $699 per dev user	Relatively inexpensive/free
Security/feature updates	Frequent (plug-in updates)	Frequent (browser updates)
Graceful degradation	HTML (noscript)	HTML (noscript)

* Browser dependent: Generally competitive HTML5 feature support across recent versions of Chrome, Firefox & Safari, but poor in Microsoft Internet Explorer until IE 9 and competitive with IE 10 only

State of the marketplace

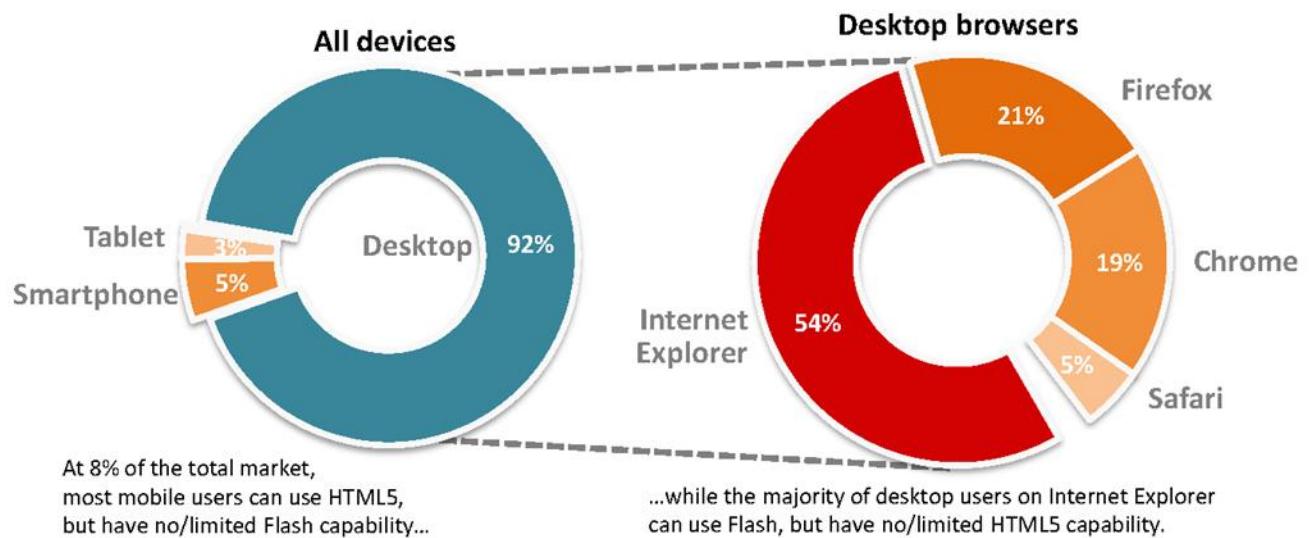|	Flash	HTML5
Laptop/desktops	**Microsoft Windows:** Preinstalled on all major Web browsers (99% share claimed) **MacOS:** Downloadable plug-in; Safari preinstall discontinued by Apple 7/2011 (MacOS Lion)	**Very good feature support:** Firefox, Google Chrome, Safari, Internet Explorer 10 (preview) **Limited support:** Internet Explorer 9 (current version) **Poor support:** Internet Explorer 7-8 or earlier
Mobile devices	**Discontinued 12/2011:** Mobile Flash will be found on older versions of Blackberry & Android devices only	**Varied support:** On all major smartphones/tablets (Android, Apple iOS, Blackberry, Windows Phone) but with fragmented HTML5 feature support

Much of HTML5's surge in popularity is due to the rise of mobile devices:

- Apple's popular **iPad** and **iPhone** mobile devices (as well as its Apple TV set-top box) cannot display Flash content in Mobile Safari, the default Web browser on its iOS mobile operating system.

- Adobe's decision to discontinue **Android** & **Blackberry** mobile Flash Player updates at the end of 2011 means that HTML5 will eventually become the sole technology for mobile Web interactivity, aside from native platform applications.

Given that mobile/handheld browsing is trending upwards, should you switch all of your company's interactive assets from Flash to HTML5? Not so fast…

- **Older Internet Explorer versions are entrenched.** IE7 & IE8 do not support HTML5 but are still in widespread use, with 28% browser market share. These older browsers may remain popular with users and institutions that do not feel compelled to upgrade from Windows XP, which still accounts for 30% market share.   This may continue well past XP's end-of-support date in 2014. (Other browsers such as Google Chrome and Firefox can be installed on XP, however IE9+ cannot.)

- **Even the current IE9 browser has only middling HTML5 support,** with some 48% of HTML5 features implemented vs. 70-80% for Firefox, Chrome, and Safari.   This situation is expected to ease only after the release of Internet Explorer 10.

- **Tablet browsing continues to grow, but remains small overall.** As of February 2012, Apple's popular iPad tablet still accounted for only 2% of all Web browsing. However, the iPad's market lead among handheld devices is substantial: It accounts for 24% of all mobile (tablet/smartphone) browsing.

The following chart summarizes the current market share for mobile and desktop browsers:

To help choose a strategy, analyze visitor traffic on your current websites. Your customers' own behavior is the best starting point to help determine the ROI of choosing Flash, HTML5, or both. Many "general" market surveys skew towards more-technical users, so we advise that you check your own traffic numbers.

- **Are many of your site visitors browsing with Microsoft Internet Explorer 7 or 8?** These users cannot view most HTML5 content; Flash is a more robust interactive platform for them. If these account for 15-20% or more of your traffic, they will be underserved by an HTML5-only strategy.
- **Are many of your visitors browsing with Mobile Safari?** These users cannot view Flash content at all; in addition, these tablet early adopters may represent more affluent or influential purchasers. If these account for 10-15% or more of your traffic, it may be time to prepare HTML5 content. (Be sure your traffic analysis excludes the desktop Safari browser, which *does* have Flash support vs. Mobile Safari, which doesn't.)

Conclusion: Our recommendations

Build with Flash, prepare for HTML5	Build both Flash and HTML5	Build HTML5, with fallbacks
▪ If you have a considerable investment in existing Flash content	▪ If you have significant traffic from Internet Explorer users ▪ If you have substantially increasing mobile traffic	▪ If you don't have significant Internet Explorer user traffic ▪ If you can forego rich media for users with older browsers
▪ **Flash is still a safe bet on the desktop**, as it will remain well-supported on desktop browsers into the future. Only mobile and tablet browsers commonly lack access to Flash. ▪ **Keep and maintain your existing interactive Flash assets.** Especially for Internet Explorer users, we recommend maintaining your existing Flash content, and continuing to add new content within existing Flash apps until the HTML5 market matures further. ▪ **Switch to HTML/Javascript on critical "first impression" pages.** If your homepage or other high-traffic landing pages use Flash, these should be replaced with HTML5 content, with fallbacks for older browsers like IE7 & IE8 (e.g. image slideshows). ▪ **Consider creating ground-up new applications with HTML5** to help ensure visibility on tablet and mobile browsers, but use Flash or HTML-only fallbacks for IE users.	▪ **Building both Flash & HTML5 is the safest option.** During this market transition, maintaining applications in both technologies will help retain the most customers: legacy IE users as well as early-adopter or influential mobile users. ▪ **This does require a larger development budget**, but ensures rich media is available to the largest set of customers. HTML5 cannot be strongly recommended as a sole strategy for most consumer websites until IE10 adoption catches up. ▪ **Choose video providers that can serve both.** Especially for video, player components and hosting are available that can push HTML5 to capable browsers, while also offering Flash playback to other browsers. ▪ **New ad banners should use HTML5.** For maximum reach, Flash-based interactive ad banners should begin transitioning to HTML5, with static image fallbacks for IE users.	▪ **Late 2012-early 2013 may be a tipping point for HTML5 adoption.** Google Chrome, Firefox, and Safari have had good HTML5 support for years, but represent only about 50% of the overall market share. Savvy retailers will prepare for the late-2012 release of IE10, which may finally help default-install Windows users catch up. ▪ **Provide basic HTML/Javascript fallback content whenever possible.** To serve the large market of older Internet Explorer users, For instance, interactive floor plans (IFPs) should degrade to static product images if HTML5 capability is not detected in the user's browser. ▪ **Plan for responsive Web design for touchscreen users.** Your HTML5 strategy should include dynamic layouts to ensure that critical navigation, content and calls-to-action remain easy to touch on phones and tablets. Lower-priority content can often be demoted or hidden from view on small-screen devices, via a link to view the full (desktop) website content.

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