

Cmput 499 - Presentation

Macromedia Flash

Presentation Report

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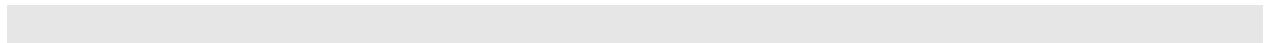
April 4th, 2002

Introduction / Background

Flash's modest beginnings began in the summer of 1996 by a company called FutureWave. FutureWave marketed a product based on vector illustration to render animation on the web, which they called FutureSplash Animator. The first big users of FutureFlash were Microsoft, which was developing MSN at the time, as well as Disney Online. In December of 1996, FutureWave was sold to Macromedia and FutureSplash Animator became Macromedia Flash 1.0. Flash is a cool way to add animation to the web that not only appeals to the audio and visual senses, it also allows for user interaction. Examples of Flash include on-line movies and video games. With the WWW, there is a demand for more versatility than what JPEG and GIFs currently offer. File sizes and downloading times is a major concern due to bandwidth limitations on the web. High-resolution images slow computers, networks and printers down because of the large size of data they contain. Even compressed images still require a large amount of data for high quality output. Flash technology makes use of vector-based graphics allowing image scalability without impacting image quality or file size.

Vector-Based Graphics

Vector-based graphics uses small, mathematical based objects to define shapes instead of pixels. In non-vector-based graphics languages, instructions are created to map out an image pixel by pixel. For example, one way to define a line is as two connected points in 2D Cartesian space. This line may contain other attributes such as thickness, style and color. To create the line, a vector graphic tells the program to draw it with X number of pixels. In bitmap programs, every pixel must be mapped out. Creating images require not only dimensions but also color patterns as well. Thus, resizing images can distort it. With vector languages, drawing lines and shapes only requires issuing commands to indicate a line's direction, color and any other attribute. Thus, there is no distortion of the image.



What can Flash Do?

Flash is a photo editor, similar to PhotoShop or Illustrator. Flash doesn't create bitmaps but functionality is available to import bitmaps and modify them by changing its properties and resolution. Flash even allows users to trace bitmaps enabling them to convert bitmaps to vector-based graphics.

Flash is also an animation-program. By changing the content of a frame within a Flash movie, animation can be created. There are two types of frames that can be created: static and key frames. Still graphics are created by using static frames and key frames are used to create animation. There are two ways that animation can be created using key frames. First, they can be linked together frame by frame displaying each frame as they are linked together. Or by tweening, which takes two frames and interpolates the contents of the frames in between the two frames specified. Frame by frame animation is very time consuming and can be a lot of work but it allows for more control of the contents. Tweening allows creators to create easy flowing movies quickly but with a little less control. In either case, the size of the animations is much smaller than bitmap animations since Flash animations also use vector-based graphics.

Flash is a multi-media program; therefore it allows the user to incorporate sounds into their graphics and movies. When importing audio files, sounds are stored as separate layers so the user can reuse these sounds without increasing the file size of their Flash file. Event sounds are independent of the timeline of the Flash movie and are triggered by the user's interaction with the movie (discussed in the next section). Stream sounds are linked to the timeline and are played for as long as is specified.

Flash is not only a multi-media program, but it is a scripting language as well. Using ActionScripts, Flash can enable action and event handlers to add interactivity to Flash presentations. Flash forms can also be created and with action scripts they can be processed much like any other CGI scripting language.

The Power of Flash

There is no wonder why Flash is so popular on the WWW today. Here are several advantages of using Flash images rather than the conventional GIFs or JPEGs.

- Vector based graphics are smaller than bitmaps, so image sizes and quality are not impacted when scaled. This makes it good for smaller bandwidths. Generally, vector graphics require $\frac{1}{4}$ the storage of pixel (or raster) images. [Mohler2001] The more complex an image is, the larger its file size. However, with vectors, file size is moved to the rendering computer's CPU instead of linking it to the physical height and width of an image. Many websites contain logos at the top of the page. Each time the page is loaded, an image must be continually encoded into a GIF. With vectors, this logo can be resized and re-rendered again and again by re-using a cached version, thus reducing file size.
- Flash has the capability to render images with anti-aliased edges. With raster images, increasing their size causes the edges around the image to lose its smoothness. The pixels start to show in a grid-like manner. Flash, on the other hand, can contain minute details and allow for 8-bit transparency without impacting the clarity of the image. This allows for users to zoom into pictures and still see a very clear rendering of the image. For slower machines, the anti-aliasing feature may be turned off for faster downloading. As well, the quality playback on Flash 5 can be set as low, medium or high quality.
- To include flash into a website site, there is no need use external code or programming. Each object can be given an assigned URL. For example, you only need a flash object, not another HTML file.
- When it comes to printing quality, a Flash image will be the same as the quality of the user's printer. That is, the dpi capability of the printer does not affect the Flash image as it is printed out at the current resolution of the printer. Raster images on the web are typically 72 dpi. This ensures that printed images are higher in quality than the conventional raster images.
- One of the amazing features of Flash is its ability to create animations easily by using vector based animations rather than GIFs or JavaScript. By using the timeline in Flash5, images can be controlled for better flow and fluidity in each frame. As well, because of their smaller file sizes, Flash animation is quicker to download.
- Flash is browser independent, thus only requires a plug-in. Flash plug-ins are already installed on Windows 95/98, Windows 2000, IE 4 and up, Netscape 4.5 and up, AOL 4.0, and MacOS 8 and higher. In a research survey conducted by NPD, it is estimated that 97 percent of browsers across the globe have a Flash player installed. This is equal to 274 million people! [Mohler2001]
- Flash uses streaming technology that allows users to see the beginning of an animation while it is still being downloaded. This is advantageous to those users who have lower bandwidths. As well, Flash uses alpha-channels, which are extraneous information, attached to an image that allows it to be rendered in different ways.
- With Flash technology, the creation of true GUI and interactive components can be created for the web. Interfaces have a more realistic feel to them making navigation

more intuitive and user friendly. At the same time, more complex images can be incorporated without the large overhead of file sizes. Flash uses both FlashScript and ActionScript to create these interactive environments.

- Not only is Flash appealing visually, sound can be incorporated to appeal to a viewer's ears. Audio and video components can be synchronized because it is included within the same Flash file, which is something not achievable in GIFs or JPEGs. To associate sound with an image, the timeline in Flash 5 is used to specify the exact frame the sound is played in. To create long-playing animations with voice-overs or music, but still retain smaller files, MP3s can be associated with the image. Flash 5 also has the ability to import other formats such as WAV, AIFF and AU. Because the audio component is stored within the same file (in .swf format), there is no need for external references or additional HTML code.
- Other features that Flash5 makes possible are:
 - Its wide assortment of tools available to easily create drawings that can be simple or very complex
 - Ease of creating transparent vector elements
 - Ease of creating buttons and menus using Flash symbols
 - Creating editable text fields within movies to simulate a form, thus we do not need to separate a flash movie from its form elements
 - Creating tweened animations where the frames in between the keyframes are automatically filled in so that the image appears to blend and flow gracefully on the screen (e.g. creating a circle that morphs into a square)
 - The ability to perform custom scripting
 - Ease of editing a movie through the use of the movie explorer, which allows the creator to sort and view the document in a hierarchical structure

Drawbacks

- Recall that flash uses lines to render images. This makes it difficult to render real world objects such as scenery. JPEG is the better choice to use whereas Flash is more suitable for drawing cartoon-like images.
 - Currently there is not a standard in place that dictates which vector format to use. There are many vector formats available which are not compatible with one another. Thus, a standard needs to be created to avoid having different versions of the same image created to run on different browsers.
 - Within a timeline, the frame rate can be specified which dictates the number of times per second a screen is redrawn. The higher the frame rate, the more smoother an animation looks. However, it is obvious that increasing the frame rate causes the CPU to redraw the picture more often, thus the slower the CPU performs. This is bad for older computers that do not have the capability of playing the animation at such a rate, whereas a newer computer may play the animation faster than the designer intended it to be played.
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How to run Flash

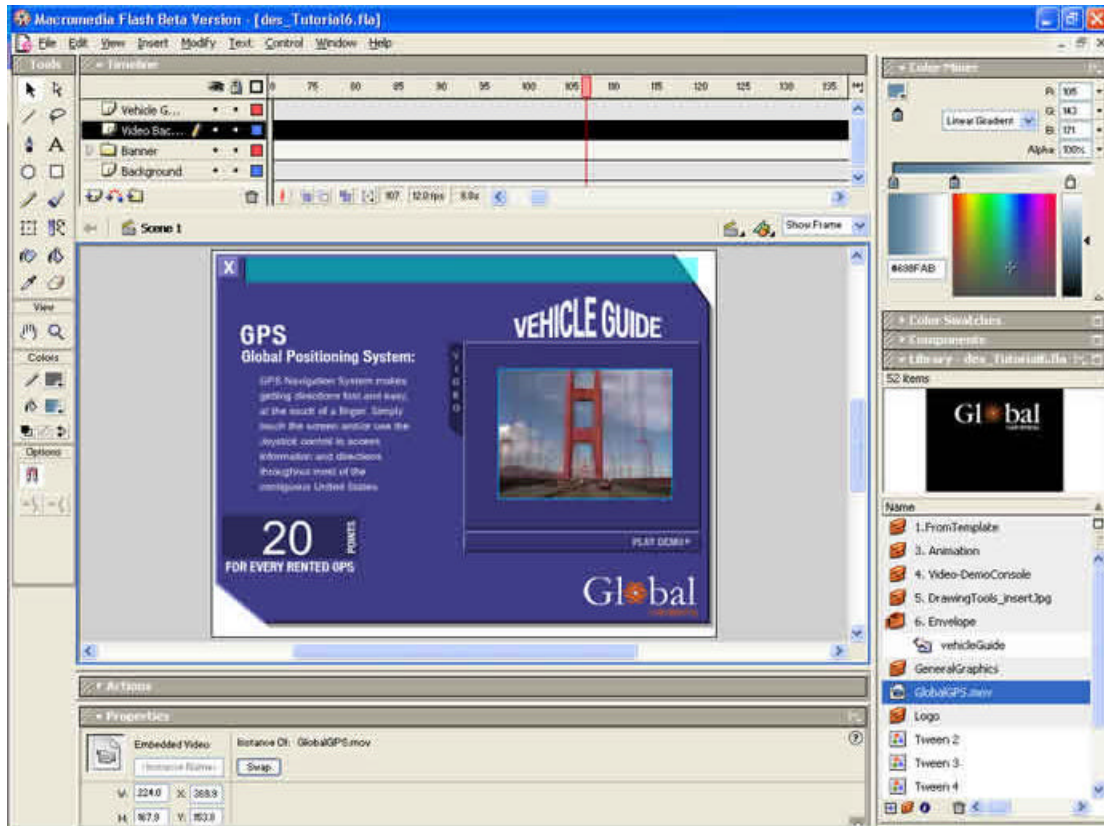
Flash Player supports scripting capabilities mentioned above and server-side connectivity. The server-side of the Flash Player stores all the Flash data. While the client-side, processes the data to assemble it into the final product. Therefore, all media and files need to be downloaded onto the client side before the user can view the Flash presentation. Also, since the files are downloaded to the client, the user has full access to the files and could edit them. This is not a good thing, since the author doesn't have complete control over the end product anymore. Flash Player is also inefficient since it requires all data files to be transferred to the client and then assembled on the client. In addition, Flash Player is limited to only playing back SWF files.

Since Flash Player has some drawbacks, Macromedia developed another application called the Macromedia Generator, which works together with Flash Player. By processing and assembling the Flash presentation on the server side, Macromedia Generator improves the protection of files and enables faster downloading.

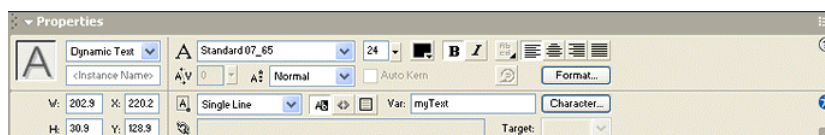
The Future of Flash

With the recent release of Macromedia Flash MX, the future of Flash seems very bright. Some highlights of new features included in Macromedia Flash MX are:

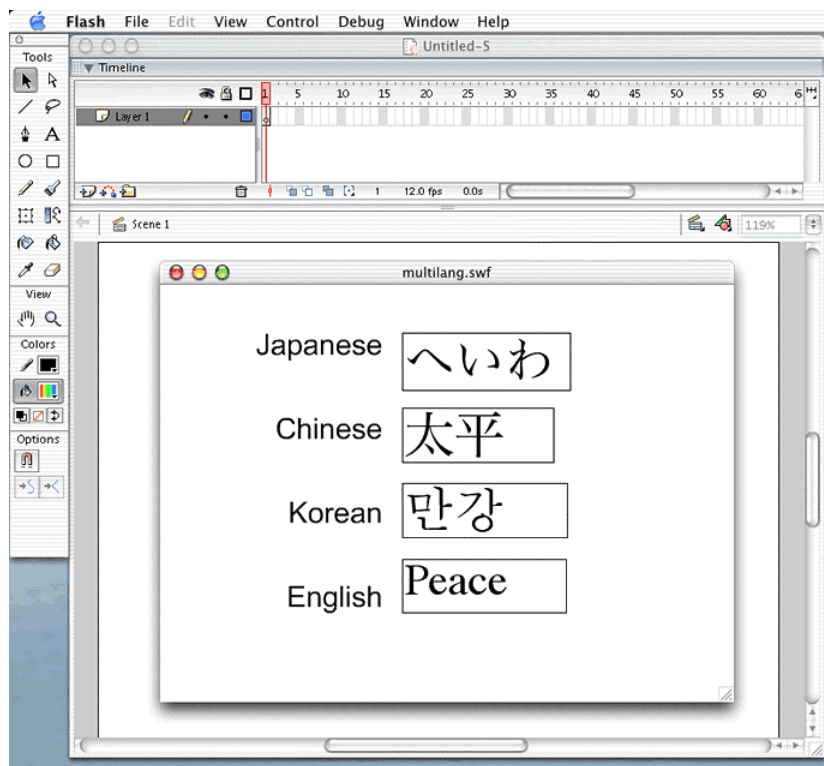
- **Video Support:** Allows the incorporation of rich content and applications, containing video. Formats supported include: MPEG, DV (Digital Video), MOV (QuickTime), and AVI. Manipulate, scale, rotate, skew, mask, and animate video objects, and make them interactive using scripting.



- **Familiar UI With New Property Inspector and Answers Panel:** Maintains same familiar and flexible development environment as previous versions. New user interface enhancements include collapsible panels and a new context-sensitive Property inspector that highlights what tools and objects can be used in relation to a selected element. It also contains a new Answers panel that connects the web to the development tool and provides useful information to designers and developers within the user interface.

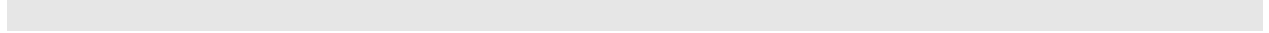


- **Dynamic Loading of Images and Sound:** Macromedia Flash Player 6 now dynamically loads external JPEG and MP3 media files during runtime, which results in smaller file sizes and the developer's easy modification of the content—without having to re-author it.
- **Optimized Application Server Integration:** Use XML structured data to populate visually rich user interfaces to create sales forms, virtual shopping carts, customer surveys, and stock availability matrixes. Persistent XML connectivity allows real-time information to be displayed.
- **Multilingual Support:** Vertical Text and support for Unicode enables developers to rapidly build multilingual content and applications. Macromedia Flash MX will ship in 11 languages, including three new languages: Korean, Traditional Chinese, and Simplified Chinese.



- **Design for Multiple Mediums:** Design and deploy content to any browser, platform, or device supporting Macromedia Flash Player, the most widely distributed rich client technology on the Internet. Macromedia collaborates with hardware, operating system, and browser providers to ensure that Macromedia Flash Player is available across leading desktop and device platforms (Microsoft Windows, Apple Macintosh, Linux, Solaris, MicrosoftTV, Symbian EPOC, Pocket PC, and others).
- **Pre-Built User Interface Components:** Accelerate development with a core set of pre-built, customizable components for common application interfaces, including scrollbars, rich text fields, input buttons, radio buttons and check boxes, and list and combo boxes. These components ensure a common user experience across rich applications created with Macromedia Flash MX.

Macromedia lead the way in innovative on multi-media presentation on the web, yet it is not a perfect program. Interactivity in a problem that Flash still lacks somewhat. Macromedia will need to expand on the event based interactive tools so that Flash can become a stronger development tool for Web games and other applications. Flash is not a hard tool but it is a little difficult to learn and use at first. Macromedia will need to improve on its work environment and make it more user friendly, so that new creators can learn Flash quickly.



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Screenshots



