PART I

Getting to Know Flash

Flash began its career humbly as a great tool for adding low-bandwidth animations to websites. Since those hallowed days, the application has grown by leaps and bounds! Yes, Flash can still animate, but it can also be used to create amazingly complex, interactive products, dynamic and data-driven websites and online applications, cartoon serials, online (and offline) games, music videos, music players, instant messengers…the list goes on and on. Flash has evolved from "simple animator" to "multimedia authoring juggernaut" in no less than 7 years. In fact, it would be hard to imagine the Internet today without Flash and what it offers to the world of interactive digital media.

Part I of this book will take you on a guided tour of Flash. You'll learn about the history of the software, explore its role in interactive digital media today, and get a brief glimpse of the directions the application might take in the future. Of course, you'll also be introduced to Macromedia's latest additions to the Flash pedigree: Flash MX 2004 and Flash MX Professional 2004. Whether you're a veteran Flash developer or a first-time user, this section of the book will show you the now, then, and possibly the tomorrow of Flash.

CHAPTER 1

Introduction to Flash

As one of the most popular and versatile applications for creating digital multimedia, Flash continues to wear many hats. Flash has always been at the cutting edge of technology for delivering compelling animated content. As a vector-based medium, Flash is also able to deliver the goods at a fraction of the bandwidth required by other animated media. What many people don't realize is that Flash can do much more than simply create bandwidth-efficient vector animation. As the application continues to evolve, its scope broadens more and more. Flash is now one of the most flexible interactive digital-media authoring tools available, offering the capabilities to run not only on the Internet and desktop computer platforms, but on game consoles and mobile devices as well. It is truly *multi*media.

To get a sense of Flash's true identity, it's helpful to become familiar with its historical lineage, makeup, and current applications. In this chapter, you will explore:

- **The history of Flash**
- **The differences between raster and vector formats**
- **The many faces of Flash**

A History of Flash

Before you dig into today's Flash, it's a good idea to cast your eye back and get an idea of how this virtual revolution in interactive multimedia came about. Besides, it's a cool story.

So, turn the "way back" machine to the late 1980s. The stage for our little story has been set with four companies. The first, Macromind, was a Chicago-based software company whose primary product was an application called VideoWorks. The second, Paracomp, based in San Francisco, was best known for its Macintosh 3D application, Swivel3D. The third company was Authorware, a Minnesota-based company best known for its CBT/multimedia authoring application, Authorware. In 1991, Macromind, which had moved to San Francisco, merged with Paracomp to form Macromind-Paracomp. Authorware then moved from Minnesota and joined Macromind-Paracomp in Redwood Shores, California, to found the mighty Macromedia—the beginning, so to speak.

As you might have noticed, this accounts for only three of the four players in our story. To learn about the fourth member of the cast, we look back to January 1993. Jonathan Gay, who had put himself through college writing such venerable early Mac games as *Dark Castle* and *Beyond Dark Castle,* convinced his buddy Charlie Jackson (founder of Silicon Beach Software) to invest some money and help form a company called FutureWave. The whole point of the company, whose first product was an application called Go, was to produce software that would dominate the pen computer market. Well, unfortunately, the early pen computers failed to really catch on, and there was some corporate interference by AT&T, so Go became an application without a market.

So FutureWave found itself in serious trouble. It was a small software company with no income and had spent a year developing an application that would never see the light of day. Their salvation came in the form of a small drawing program called SmartSketch that they had developed as a sideline to Go. FutureWave began marketing SmartSketch as a computer-based drawing solution for both Macintosh and Windows platforms. It wasn't long before people were asking why FutureWave didn't turn SmartSketch into a 2D animation program. In perhaps one of the most stunning examples of technological foresight, FutureWave shifted the focus of SmartSketch from a static image-creation program to an animation program. This shift was based solely on the hope that the Internet—something that everyone was beginning to talk about—would be a great medium for delivering 2D animation.

After both Adobe and Fractal Design declined to buy the technology (they must be kicking themselves now!), FutureWave shipped its FutureSplash Animator in the summer of 1996. FutureSplash Animator was a relatively simple application for creating linear vector-based animations. After its release, the application gained some attention when it was used in the design of both Microsoft's web version of MSN and Disney's subscription-based Disney Daily Blast. In November 1996, Macromedia approached FutureWave about the

possibility of the two firms working together. For FutureWave, which was still a tiny company with only six employees, this was an astonishing opportunity. So, in December 1996, FutureWave sold the technology to Macromedia, which released the first Flash in early 1997. The rest, as they say, is history.

Once it was picked up by Macromedia, Flash began to evolve as a software tool. Each new version offered significant advances in the application's capabilities and usability:

Flash 1 Flash 1, which was really just a rebranded version of FutureWave's FutureSplash, featured very basic (by Flash MX's standards) timeline-based vector animation. Its primary strength was that, with the help of either a Netscape plug-in or an Internet Explorer ActiveX control, the user could mount animations on the Web for anyone to view and enjoy.

Flash 2 Flash 2 was a major step for the application. Generally speaking, it began the transformation of Flash from a straight linear-vector animation program to an interactive media-design program. The shift resulted from the integration of such features as reusable button symbols, embedded graphics, vector fonts, very basic actions, and stereo audio. Flash 2 also supported the import of an impressive selection of file formats, including EPS, GIF, JPEG, AutoCAD DXF, BMP, Enhanced Metafile, AIFF, Windows Metafile, and Shockwave.

Flash 3 One of the most significant additions to Flash 3, besides the continual improvement to the user interface, was the increasing importance and integration of actions. Based loosely on JavaScript, actions (which would later evolve into ActionScript) enabled users to add a certain measure of control and interactivity into their movies. In addition, the integration of masks, shape tweening, and transparency allowed users to exert much more control over how their Flash creations actually looked.

Flash 4 One of the most exciting improvements in Flash 4 was the ability to implement compressed MP3 audio files in the context of a Flash movie. Flash 4 also boasted improved ActionScript, which made it easier to create interactive games and interfaces. Other enhancements included editable text fields, an improved user interface, and a simplified publishing process.

Flash 5 The greatest advance in Flash 5 was definitely ActionScript. By aligning itself with the ECMA-262 standard, Macromedia announced to the world that Flash and ActionScript were ready to compete with the "big dogs." Other changes in this version were in the user interface: additional art tools, the introduction of panels, the Movie Explorer, the Macromedia Dashboard (for online help and updates), and user-customizable keystrokes for common tasks and functions.

Flash MX Flash MX was a major step forward for Flash. While this newest version of Flash was really just the sixth incarnation of the program, Macromedia replaced the numerical version name with the *MX* moniker. Why the new name? Well, according to Macromedia,

they made the switch to *MX* to inform developers that the software presents integrated solutions to Internet-based digital media. Because Macromedia's tools (Flash, Dreamweaver, ColdFusion, and so on) can be so tightly integrated, the company felt it was only appropriate that the various applications carry the same name. *MX* is simply a label used for this family of Macromedia tools. The initials don't actually stand for anything in particular, and the Flash community simply had to accept this change at face value—despite the fact that some were somewhat grumpy about the name change.

In terms of the program features, Flash MX was definitely a worthy upgrade. The most notable was the new, more streamlined and usable user interface. The program also featured components—drag-and-drop widgets and doohickeys—that under normal circumstances would take a very long time to create by hand. In addition, the integration of a host of new visual design tools, such as the free transform tool, the envelope modifier, enhanced text support, and an enhanced Color Mixer, allowed Flash authors to exert far more control over how they grant interactive creation looked. Finally, Flash MX featured enhanced support for rich media, such as audio, digital video, and external images.

Flash has clearly come a long way. Features that once seemed amazing and unbelievable in one version pale in comparison to the possibilities offered in subsequent upgrades. As you will soon discover, Flash MX 2004 and Flash MX Professional 2004 are another significant step forward. Like the upgrades that came before it, Flash MX 2004 and Flash MX Professional 2004 offer options and features that will continue to keep Flash at the forefront of digital media and Internet development.

Raster vs. Vector Formats

Computers can store and display graphics in two main formats: *vector* and *raster.* To better understand how Flash works and why it presents advantages over other kinds of animation applications, it's vital that you understand the differences between these two graphic formats.

One of the aspects of Flash that makes it unique is its use of *vectors* to display much of its animated content. Vectors are line representations of an image. Like cartoons, they resemble an actual image but don't look completely realistic. The vectors that create an image give it shape and color. The curves of the vectors give an object its shape and contour. Every vector has two color properties: stroke (or outline) and fill; these properties (see Figure 1.1) give a vector image both its outline and overall color.

The kicker about vector images is that stroke and fill are calculated mathematically. This is very important when it comes to animation.

Raster images, which are sometimes referred to as bitmap images, are very different from vector images. A raster image is created by a collection of pixels. A *pixel,* which is a hybrid word combining *picture* and *element,* is a colored dot or tile. A raster image, which can contain millions of pixels, works like a mosaic. Each little colored tile, which consumes a fixed amount of your computer's memory, plays a role in creating the overall color makeup and detail of the image. For an illustration of raster format, see Figure 1.2.

One of the major differences between vector and raster images is in their scalability. Because the components of a vector image (stroke, fill, and so on) are calculated mathematically, they can be scaled, stretched, and manipulated by the computer without any loss of the image's clarity or resolution. The same, however, is not true for raster images. They have a preset grid configuration, so any change in size alters the grid. When the size of a raster image is increased, the computer must interpolate (make an educated guess for) the additional pixels needed to make a larger grid. This can result in unwanted "chunkiness" or "blockiness" in the enlarged raster graphic.

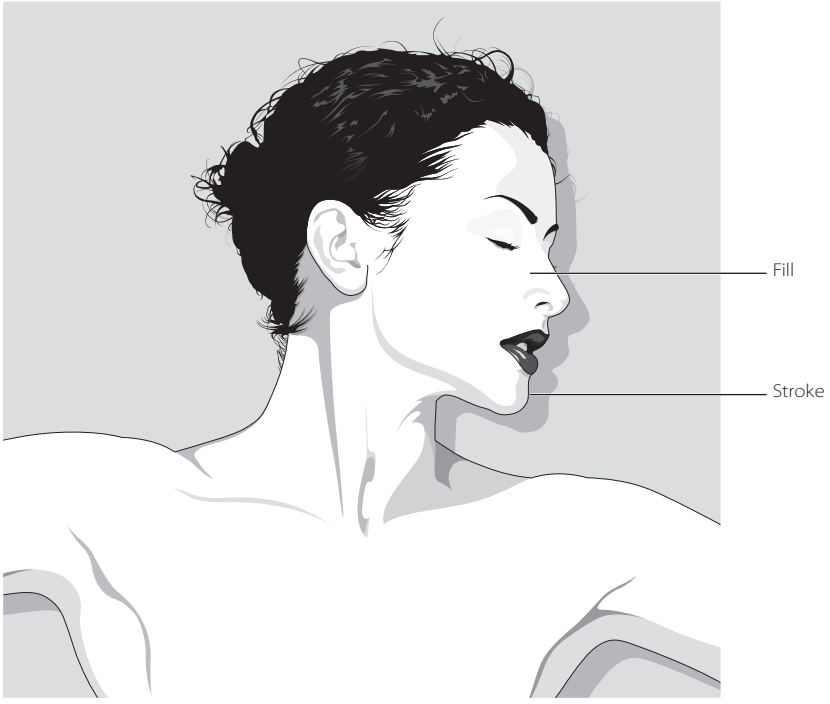
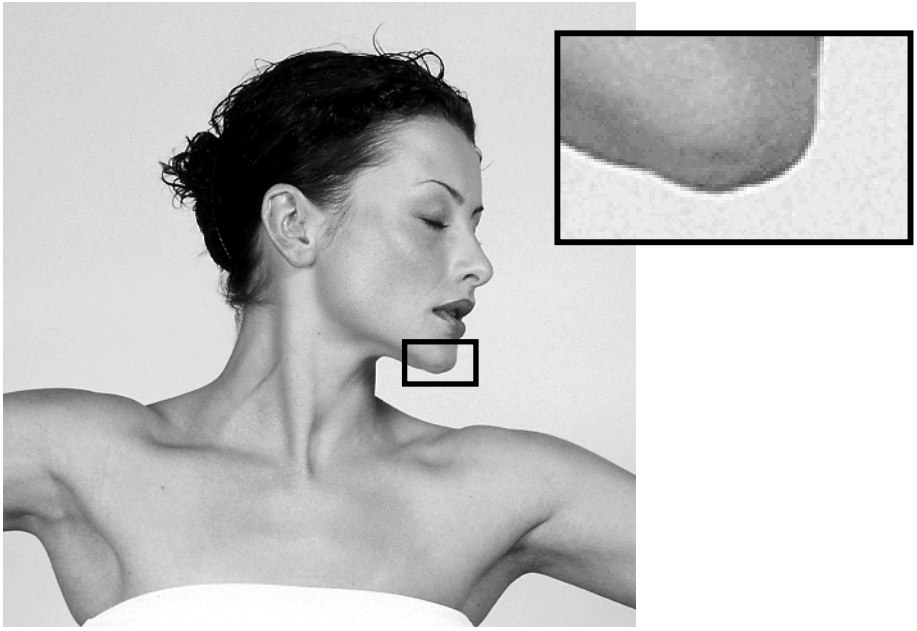


Figure 1.1
The stroke and fill of a vector image give it its overall graphic properties.

Figure 1.2
A raster image is created using a series of colored tiles, or pixels, arranged in a grid format.



The Many Faces of Flash

As you probably know by now, Flash isn't just an animation tool. So, what *is* it, then? Rather than try to define Flash, it's better to exemplify what it can do. Its presence and application around the world speak volumes.

Broadcast Media

Even though Flash is probably most "at home" on the Web, it has also made its way to broadcast media in recent years. This transition shouldn't come as a surprise. After all, Flash has proven to be a powerful animation tool and can be exported to a variety of file formats.

Flash has been used for several broadcast applications, both in Europe and in the United States. In the U.K., the web design firm Kerb developed one of the first broadcast cartoon series that was created entirely in Flash. You can check out the series, *Hellz Kitchen,* an irreverent and hilarious look at a group of slightly deranged talking vegetables, by visiting Kerb's website (`www.kerb.co.uk`).

Though it has since gone off the air, Flash could be seen in the United States in the intro animation of *The Rosie O'Donnell Show*. Another great example of Flash in broadcast media is the Spike TV (formerly TNN) show *Gary the Rat*. Created entirely in Flash, *Gary the Rat*

chronicles the escapades of an attorney (voices by Kelsey Grammer) so unscrupulous that he actually turned into a rat. To check out the show's website, visit www.spiketv.com/shows/animation/gary_the_rat/index.jhtml.

> For more information on this and other uses of Flash as a "convergent media," see www.macromedia.com/macromedia/proom/pr/2000/converge.html.

Mobile Computing/Communications

As computers continue to become both smaller and more communicative, Flash will be part of the revolution. The Flash Player is poised to deliver content to a wide variety of web-ready gadgets and mobile devices. This includes business applications news services, games, educational applications, maps and geographical aids, event guides, entertainment, wireless applications, and so much more—the works!

One of the first mobile platforms to support Flash was Microsoft's Pocket PC. You can read more about Flash for the Pocket PC platform at www.macromedia.com/software/flashplayer/pocketpc. For those who use handheld mobile devices that feature the Palm OS operating system, don't despair! While the Flash player is almost always associated with the Pocket PC operating system, the most recent models of Sony's popular Clié handheld (which runs on Palm OS) includes the Flash player.

The science fiction doesn't stop there. Flash is also being developed for implementation on mobile phones and other handheld or portable computing devices. For more information, see www.macromedia.com/software/flashplayer/resources/devices.

For an introduction to the ins and outs of developing Flash content for the Pocket PC operating system, check out Chapter 33.

Gaming Consoles

Arguably one of the most unexpected applications of Flash has been in the interactive entertainment industry—console games, to be precise.

The most noteworthy example was the use of Flash to create the user interface for LucasArts' popular *Star Wars: Starfighter* game for PlayStation 2 and Xbox. Although LucasArts had designed the in-game/heads up display (HUD) interface for *Starfighter*, they encountered a serious problem near the end of their development cycle when they realized that they were lacking a functional out-of-game user interface. Enter Macromedia Flash. LucasArts partnered with two companies, Secret Level (www.secretlevel.com) and Orange Design (www.orangedesign.com), to design the out-of-game interface using Flash. Released in February 2001, first for PlayStation 2 and then for Xbox, the game served as a milestone in Flash history.

For more information on how Flash was used in *Star Wars: Starfighter*, see the Gamasutra article at `www.gamasutra.com/features/20010801/corry_01.htm`.

Excited by the possibilities of using Flash content in console and PC games, Secret Level began development of a software development kit (SDK) called Strobe. Designed to provide hardware-accelerated Flash-content rendering for games, Strobe's core engineering supported 60fps playback on both Playstation 2 and Xbox. Unfortunately, in June 2001, Strobe's development was put on hold pending the finalization of licensing terms with Macromedia.

Interestingly, in May 2001, Macromedia and Sony announced a partnership geared toward bringing the Flash Player to Sony PlayStation 2. Facilitating in-game visual design like that featured in *Star Wars: Starfighter* was high on the partnership's list of goals. Offering a complete range of Flash-facilitated connected entertainment experiences in the emerging broadband era was also an important focus for the new partners. Unfortunately, since the announcement, both companies have been totally silent about any kind of successful completion of any collective goals that have emerged from the partnership.

However, this series of rather disheartening events did not spell the end of Flash content on game consoles. Pleased with the process of Flash content integration in *Star Wars: Starfighter*, LucasArts once again teamed up with Orange Design to develop a Flash-based out-of-game interface for *Star Wars: Starfighter*'s sequel, *Star Wars: Jedi Starfighter*. Released in March 2002 for Playstation 2 and in May 2002 for Xbox, *Star Wars: Jedi Starfighter* showed that console games were an excellent place for Flash content.

Hopefully, future Flash/game console collaborations will open new avenues for Flash and Flash developers alike.

The Internet

Flash started as a tool for deployment of animated content on the Internet and, well, some things will never change. No matter how Flash continues to advance in the areas of connectivity, media authoring, and audience interactivity, it will always be a web development tool at heart. To get a sense of this tradition, see the Inspirational Design Model sections throughout this book. Most of these projects are web-based and present a very rounded view of the possibilities that this application presents.

In addition to delivering information and entertainment, Flash is used for advertising. To read how Flash can track advertisements, see the article at `www.macromedia.com/resources/richmedia/tracking`.

Edutainment

As the Web has become more complex, more easily accessed, and more plentiful in rich media, it has increasingly become a destination for those wanting to be educated and

entertained at the same time. Edutainment is a subset of media (online or offline, interactive or not) that presents science, history, or culture in a compelling and entertaining manner. This is where Flash-based edutainment enters the picture. Flash allows for the creation of nonlinear, self-motivated, educational, exploratory experiences that feature compelling and powerful use of sound, video, imagery, and interactivity. While there are a select group of outstanding examples of Flash-based edutainment, there is little doubt in my mind that the über example is *Becoming Human* (`www.becominghuman.org`).

Developed jointly by NeonSky Creative Media (`www.neonsky.com`) and Terra Incognita (`www.terraincognita.com`) for the Arizona State Institute for Human Origins, *Becoming Human* is an original interactive Flash documentary that explores human evolution from our earliest ancestors to the emergence of *Homo sapiens. Becoming Human* features a host of innovative and interactive tools (such as interactive exhibits) that allow you to go beyond the Flash documentary itself and pursue your personal exploration into the fascinating world of human evolution.

Becoming Human is partitioned into several sections that allow you to explore questions about culture, hominid anatomy, archaeological evidence, and lineage. Each section features not only a spectacular linear Flash documentary narrated by the prestigious paleoanthropologist Dr. Donald Johanson, but also topical discussions by many other prominent scholars in the field of human evolution. The combination of the linear documentary and the interactive exploratory tools (both of which are created totally in Flash) makes *Becoming Human* one of the most interesting, innovative, and cutting-edge Flash creations out there.

This book contains several additional excellent examples of Flash-based edutainment for you to discover and experience, including *Yin Yu Tang: A Chinese House* (Chapter 7), The Theben Mapping Project (Chapter 4 and the color section), and *Langlevelater* (Chapter 10).

Flash isn't just for edutainment, it's also used in educational settings. Not only does the new Slides feature allow instructors to create interactive presentations, but there are also third-party applications for creating educational Flash-based applications. Easily one of the most interesting (and innovative) applications is from eHelp (`www.ehelp.com`). Based in San Diego, California, eHelp (which will become part of Macromedia in December 2003) makes RoboDemo for creating interactive Flash-based software simulations. In addition, they make RoboPresenter, incredibly cool software to allow you to convert PowerPoint presentations into low-bandwidth Flash movies. On this book's accompanying CD, you'll find demo versions of RoboDemo and RoboPresenter, as well as a tutorial on how to create Flash-based software simulations with RoboDemo (in Bonus Chapter 3).

Web Games and Cartoons

Flash is great for creating multimedia and interactive navigation, but it is *superb* for creating fun stuff! Why do we try to pass Flash off as such a "serious" application, when a large portion of its development community is dedicated to doing work that is meant to be anything but serious! Games and cartoons are another important part of the Flash oeuvre.

FLASHTOON TOOLS

As Flash webtoons and animated shorts have become more and more popular, a spate of tools have cropped up to facilitate their creation. As with all things digital, some tools are better than others. Arguably one of the most mature, usable, and feature-rich is Toon Boom Studio (`www.toonboomstudio.com`). Developed by the Montreal-based company Toon Boom (`www.toonboom.com`), Toon Boom Studio is a 2D animation application that facilitates the creation of compelling animation targeted to the Web, digital video, wireless devices, and beyond. Among many other things, the program features powerful and intuitive 3D scene planning, advanced camera manipulation, lip sync tools, and project management. The great thing about Toon Boom Studio, beyond its robust features, is that it's one of the best-priced 2D animation solutions for short-form or "flash"-style productions. All in all, Toon Boom Studio is a great product for Flashers who are looking for a great way to bring their animated aspirations to life.

A demo copy of Toon Boom Studio (for both PC and Mac) has been included on this book's accompanying CD.

Kiosk Development

A *kiosk* is a piece of custom computer hardware that delivers a fixed body of information, usually through a very user-friendly interactive interface. Kiosks are most commonly used in situations where an organization wants to let the user control the access to information (usually through a touch screen or a mouse-driven interface) that would traditionally be delivered by a receptionist or another such individual. Because Flash can create powerful interactive experiences that are both complex and beautiful, it naturally lends itself to creating kiosks.

Although it would be difficult to provide a representative list of all the kiosks that have been developed with Flash, there are a few very noteworthy examples that we absolutely must mention. In late 2000, Moccu (`www.moccusite.com`) presented the prototype for a touch screen, Flash-based petrol pump at CeBit in Hannover, Germany. Designed to let motorists search for information on travel routes and traffic situations, browse special

shop offers, and even send e-mail while they're filling their tank, the CeBit pump prototype has yet to be implemented. It will be an outstanding and exciting example of the possibilities of merging Flash content with nontraditional computing environments such as kiosks (and even web-enabled appliances).

While commercial kiosk applications are a great place for Flash to spread its wings, kiosks are equally common in museum exhibits and galleries. One of the most eloquent experts in cultural kiosk Flash design is Second Story Interactive. Based in Portland, Oregon, Second Story Interactive (`www.secondstory.com`) has created a string of Flash-based kiosks that range from the educational and entertaining to the highly compelling.

Arguably one of their most entertaining (as well as educational) was the *Inventions & Inspirations: History of Recorded Sound* kiosk. From Thomas Edison to Public Enemy, from gramophones to digital sampling, this interactive kiosk tells the epic story of the individuals and innovations that transformed how we create and experience music. Housed in the Sound Lab of Seattle's Experience Music Project, *Inventions & Inspirations: History of Recorded Sound* traces the evolution of making and capturing sound, and features visionaries with their inventions and influential musicians who embraced invention in their artistry, as well as each innovation's impact on audience experience. The kiosk also includes interactive modules that demonstrate what sound is and how we're able to record it.

Digital Art

Some Flash work defies description and needs no explanation. As the audience, you can take away from the experience whatever you like. Works of this nature can be called only one thing: art.

There are many individuals who are pushing the boundaries of Flash in ways that challenge current thinking about interactive, digital media. Two of these individuals are featured in this book: Maruto (Josh Davis), and Yugo Nakamura. See this book's color section for a glimpse into their work and for links that will allow you to experience it firsthand at your computer.