Chapter 1

Understanding the Adobe Flash CS4 Blueprint

IN THIS CHAPTER

- **Exploring the uses of Flash CS4**
- **Identifying Flash file types**
- **Introducing the structure of Flash documents**

Since its humble beginnings as FutureSplash in 1997, the Flash authoring tool and the Flash platform have matured into a powerful tool for deploying a wide range of media content. With every new version released, the possibilities have increased for imaginative and dynamic content creation — for the Web and beyond. After Adobe acquired Macromedia in 2005, Adobe has expanded Flash capabilities in several Creative Suite products, as well as development tools such as Adobe Flex Builder. The Adobe user interface is consistent across powerhouse applications such as Adobe Photoshop, Adobe Flash, and Adobe Illustrator.

In this chapter, we introduce Flash CS4 and explore the many possibilities available for your productions. We also discuss how Flash compares to or enhances other programs that you may be familiar with.

Flash content can be viewed in a few different ways. The most common method is from within a Web browser, either as an asset within an HTML page or as a Web site completely comprised of a master Flash movie using several smaller Flash movies as loaded SWF assets. The Flash Player is also available as a stand-alone application (known as a *projector*), which can be used to view movies without needing a Web browser or the plug-in. This method is commonly used for deployment of Flash movies on CD-ROMs, floppy disks, or other offline media formats.

CROSS-REF **You can learn more about projectors and stand-alones in Chapter 22, "Using the Flash Player and Projector."**

The Key Is Integration

Flash has seen significant development over its 12 years in both capability and design. Consistently with each new release, designers and developers push the technology into new territory. In its current iteration, Flash CS4 enables you to

create content that's compatible with Adobe Flash Player 10, one of the largest updates to the Flash Player. There are two sides of the integration coin: designing the user interface and high-end programming with ActionScript 3.0. Flash CS4 continues to satisfy both designers and programmers — all the new authortime visual effects in Flash CS4 and Flash Player 10 are fully programmable with ActionScript, the programming language of Flash.

Flash CS4 Professional, also referred to simply as Flash CS4, adds several enhancements to previous editions:

- **One version:** You don't have to worry about which version of the Flash authoring tool to purchase — there's only one version! If you haven't upgraded from Flash 8 or earlier, you might be using one of two editions of the Flash authoring tool. If you have Flash CS4, you have access to any feature we discuss in this book (and more!).
- **CS4 interface:** Flash CS4 sports a completely revised user interface layout, with tools and panels that match the look and feel of other Adobe Creative Suite applications such as a Photoshop and Illustrator. The panels can be docked or stacked, and panels can be reduced to icon-only or icon-and-text views.
- **Adobe document import:** Because Adobe oversees the development of Photoshop, Illustrator, and Flash, it's much easier to coordinate file format interoperability between the applications. You have more options than ever to faithfully bring Photoshop, Illustrator, and After Effects content into Flash documents. Many of the CS4 tools can now export XFL packages that enable a smooth workflow from tools such as Illustrator and After Effects into Flash.
- **Adobe Device Central CS4:** Flash CS4 ships with an updated version of Adobe Device Central. This program enables you to set up a Flash, Photoshop, Illustrator, or After Effects document prepped with the proper screen size and attributes for deployment to a wide range of mobile devices. Presets for manufacturers such as Nokia, Samsung, and Motorola determine the frame size, frame rate, FlashLite (or Flash Player) version, and ActionScript version compatible for each device.
- **Improved animation and drawing features:** It's easier than ever to apply motion tweens to your Flash artwork with the new Motion Editor panel and the Motion Presets panel. Every aspect of your motion tween can be accessed and updated in the Motion Editor panel, sporting a look and feel very similar to the Timeline panel of Adobe After Effects. Flash CS4 also includes a new Deco tool that can draw intricate patterned fills within your artwork.
- **Improved font menus:** If you've used other Adobe graphics software such as Photoshop and Illustrator, you likely miss the font family lists in past versions of Flash. In Flash CS4, you'll find a consistent font menu across the CS4 product line.
- **3D transformations:** You can now control a third dimension, or the Z axis, on two dimensional (2D) artwork created or imported into your Flash document, including video! You can animate the X, Y, *and* Z axis of objects in the new Motion Editor!
- **Inverse kinematics (IK):** Adobe added two new tools, the Bone tool and the Bind tool, to create linked segments that respond as a contiguous element. For example, if you want to create an animated frog, you can create the independent pieces of the frog's shape, connect them with the Bone tool, and then animate the entire frog! If you move one connected element in the chain of elements, the whole framework responds.
- **Adobe Flash Media Encoder:** Adobe did an excellent job retooling the compression settings and options for the Flash Video CS3 Encoder, which is now called the Adobe Media Encoder. Now you can export AVC/H.264 video content compatible with Flash Player 9 Update 3 or later.

- **Flash Player detection update:** Flash CS4 improves the Flash Player detection capabilities in the Publish Settings' HTML tab. Flash CS4 can create one HTML page that detects a target version of the Flash Player and displays the appropriate content. Geoff Stearns' SWFObject, which we covered in *Flash CS3 Professional Bible* (Wiley, 2007), is now the standard for Flash Player detection in Flash CS4.
- **Authoring for Adobe AIR:** You can now directly publish your Flash documents to the new Adobe AIR platform. AIR enables you to run Flash, HTML, and PDF content directly from the desktop, without a Web browser!
- **Updated Project panel:** The new Project panel in Flash CS4 requires much less work for you to get a set of folders and files ready for easy access in the authoring environment. You no longer need to manually create folder structures and link files to a project file.
- **Adobe Soundbooth sample sound library:** Flash CS4 ships with over 150 sound-effect audio files from Adobe Soundbooth. You can use these sound effects with your Flash content royalty free.
- **Improved Library panel:** The Library panel in Flash CS4 is now searchable, and you can now create new symbols in specific folders in the Library panel.

Many enhancements are not directly seen in the authoring environment, though. Flash Player 10 adds the following enhancements, among others:

- **Enhanced creative effects:** In addition to the 3D treatment of 2D objects mentioned earlier in this chapter, Flash Player 10 features a new custom filter-creation tool, the Adobe Pixel Bender toolkit. This new filter-creation tool, based on the scripting language called Hydra, enables you to build your own filter effects! There's also a completely revamped text layout engine, which can support right-to-left (RTL) languages such as Hebrew and Arabic, vertical text layout, and typographic elements like ligatures.
- **Visual performance improvements:** Flash Player 10 can offload more heavy graphics processing directly to the video graphics card. This hardware acceleration enables faster compositing of graphics and video content in your Flash files.
- **Audio/video enhancements:** You can use new transport protocols for real-time streaming video and peer-to-peer connections. Adobe has a new audio codec, Speex, added to Flash Player 10 for better real-time voice communications.
- **Enhanced local file access:** Previous releases of the Flash Player could only access file bytes but not display or manipulate them back to the local system without using a remote server to communicate and download updated content. Flash Player 10 now enables a user to load a local file and save new content back to the desktop without any server interaction.

If you're targeting a Flash Player 6 audience, you might want to consider targeting Flash Player 10 as well. Why? Flash Player 6 is capable of running Express Install scripts, which enable a Flash movie to automatically update the installed version of the Flash Player. Also, users with Flash Player 7 or later can receive automatic player updates. By default, Flash Player 7 checks Adobe's site every 30 days for new player updates. This process occurs silently in the background and doesn't require the user to upgrade his or her player installation manually. Theoretically, then, within 30 days of the release of any new Flash Player, including Flash Player 10, most browsers that had Flash Player 7, 8, or 9 will then have Flash Player 10.

For a complete list of features in Flash CS4, open the new browser-based help system by choosing Help ➪ Flash Help, and then selecting Using Flash ➪ Using Flash CS4 Professional ➪ Resources ➪ What's New ➪ New Features.

Adobe also released new versions of Dreamweaver and Fireworks, as part of the CS4 Web Suite software bundle. The user interfaces for Flash, Dreamweaver, and Fireworks are very similar, each touting a Property inspector, dockable panel sets, and specialized tools to integrate the products with one another.

Although the broad array of Flash work created by Web designers and developers already speaks for itself, the sleek interface and the powerful new features of Flash CS4 surely inspire more challenging, functional, entertaining, informative, bizarre, humorous, beautiful, and fascinating experiments and innovations.

There are more ways to use Flash than there are adjectives to describe them, but here are just a few examples:

- Forms for collecting user information and dynamically loading custom content based on this interaction
- Real-time interaction with multiple users on a forum or support site, including live audio/video feeds of connected parties
- Complex online games with rich graphics and interaction, including multiplayer games
- A video portfolio using Flash Video capabilities and dynamic loading of content
- Animated ID spots and loading screens with built-in download detection
- A practical Web utility, such as a mortgage calculator or a search tool
- Robust chat rooms based on XML and server-socket technology
- An audio interface dynamically pulling in requested songs, using native Flash 8 support for MP3 loading
- Interactive conceptual art experimentations involving several users, 3-D, or recording and playback of user interaction
- Shopping and e-commerce solutions built entirely by using Flash and server-side technology
- Interfaces for kiosks at museums, banks, and shopping centers
- Alternative content or movie attributes based on system capability testing (if a device or desktop doesn't support audio streaming, then a text equivalent of the audio transcript is presented to the user)
- Projectors used for creating slide show presentations in the style of PowerPoint, either on CD-ROM or an alternative storage device
- Broadcast-quality cartoons, advertising, or titling
- Optimized animations for the Web, and for mobile devices such as cellphones or PDAs
- An interface that addresses accessibility issues by modifying certain elements when a screen reader is active
- Flash movies specifically exported for use in digital video projects requiring special effects and compositing

This list is obviously far from complete and is ever expanding with each new release of the program. As you can probably tell from this list, if you can imagine a use for Flash, it can probably be accomplished.

The topography of Flash CS4

Before you attempt to construct interactive projects in Flash, you should be familiar with the structure of the authoring environment. Even if you already know a previous version of Flash, learning this is advisable. That's because with the release of Flash CS4, Adobe has reorganized existing features to the interface and has either moved or improved other features and functionalities. So, to get a firm footing in the new interface, we strongly suggest that you work your way through this book — from the beginning.

CROSS-REF **Chapter 4, "Interface Fundamentals," introduces the updated Flash CS4 interface and gives you tips for customizing your workspace and optimizing your workflow.**

Moreover, you need to proactively plan your interactive projects before you attempt to author them in Flash. An ounce of preplanning goes a long way during the production process. Don't fool yourself — the better your plan looks on paper, the better it performs when it comes to the final execution.

CROSS-REF **We detail the foundation for planning interactive Flash projects in Chapter 3, "Planning Flash Projects," and you will find these concepts reiterated and expanded in chapters that discuss specific project workflows. Chapter 19, "Making Your First Flash CS4 Project," is a great place to start applying these planning strategies.**

We consolidated the overview of interactive planning in the early chapters of the book. In later chapters, we included step-by-step descriptions of real-world projects that allow you to see how all the theory and planning suggestions apply to the development of specific projects.

CROSS-REF **Chapter 31, "Creating a Game in Flash," walks you through the logic required to design and script a functional and engaging game. Chapter 33, "Building an Image Gallery Component," describes the process of creating an entire component from the ground up, utilizing many of the visual effects available in ActionScript.**

There are two primary files that you create during Flash development: Flash document files (.fla) and Flash movie files (.swf). We discuss both of these formats next.

File types in Flash CS4

Flash document files (.fla) are architected to provide an efficient authoring environment for projects of all sizes. Within this environment, content can be organized into scenes, and the ordering of scenes can be rearranged throughout the production cycle. Layers provide easy separation of graphics within each scene, and, as Guide or Mask layers, they can also aid drawing or even provide special effects. The Timeline shows keyframes, motion and shape tweens, labels, and comments. The Library (which can be shared amongst movies at authortime or at runtime) stores all the symbols in your project, such as graphics, fonts, animated elements, sounds or video, and components.

Flash documents

Throughout this book, you will see us refer to Flash documents (or Flash files), which are the .fla files created by Flash CS4 when you choose File ➪ New and choose one of the Flash File options from the General category tab. Unlike some graphics applications, such as Adobe Illustrator, the file icon or file extension for Flash documents does not reflect the version of the authoring tool. For example, all previous versions of Flash and now CS4 save Flash documents as .fla files. You cannot open later version documents in previous versions of the authoring tool. You do not use Flash documents with the Flash Player, nor do you need to upload these files to your Web server. Always keep a version (and a backup!) of your Flash document.

TIP **Flash CS4 allows you to resave your Flash CS4 document file (.fla) as a Flash CS3 document file. Choose File ➪ Save As and select Flash CS3 Document in the Save as type menu. If you save the document in this manner, you can open the Flash document file in the Flash CS3 authoring application. If the Flash CS4 document used features unavailable in Flash CS3, you receive a warning as you save the document in the Flash CS3 format.**

In Flash CS4, you have the option to create four different types of Flash files: Flash File (ActionScript 3.0), Flash File (ActionScript 2.0), Flash File (Adobe AIR), or Flash File (Mobile). If you are targeting Flash Player 8 or earlier, you should always choose ActionScript 2.0. If you are targeting Flash Player 9 or later, and you want to use the advanced coding style of ActionScript 3.0, you should choose Flash file

(ActionScript 3.0). You can change your target version of ActionScript and the Flash Player at any time by clicking the Flash tab in the File➪Publish Settings dialog box. If you want to deploy a desktop application, choose Flash File (Adobe AIR). AIR applications require ActionScript 3.0. If you want to deploy content to mobile devices, use the Flash File (Mobile) option. This option automatically launches Device Central CS4, prompting you to choose a device profile to target with your Flash content.

NOTE **Choosing Flash File (ActionScript 3.0) and Flash File (ActionScript 2.0) targets Flash Player 10 by default in the new document's publish settings. Be sure to change the targeted Flash Player version in the Flash tab of the Publish Settings dialog box (File➪Publish Settings) to create Flash content targeted to the appropriate Flash Player version.**

CROSS-REF **Adobe Device Central CS4 is discussed in more detail in Chapter 20, "Publishing Flash Movies."**

Figure 1.1 shows how Flash documents are composed of individual scenes that contain keyframes to describe changes on the Stage. What you can't see in this figure is the efficiency of sharing libraries among several Flash documents, loading other external assets (image, sound, video, or other Flash files) into a parent, or "master," Flash movie by using ActionScript, or creating interactive elements with scripting methods.

Flash movies

When you publish or test a Flash document, Flash CS4 creates a Flash movie file with the .swf file extension. This file format is an optimized version of the Flash document, retaining only the elements from the project file that are actually used. Flash movies are uploaded to your Web server where they are usually integrated into HTML documents for other Web users to view. You can protect your finished Flash movies from being easily imported or edited in the authoring environment by other users.

CAUTION **The Protect from import option in the Publish Settings dialog box does not prevent third-party utilities from stripping artwork, symbols, sounds, and ActionScript code from your Flash movies. For more information, read Chapter 20, "Publishing Flash Movies."**

Much of the information contained originally within a Flash document file (.fla) is discarded in the attempt to make the smallest file possible when exporting a Flash movie file (.swf). When your movie is exported, all original elements remain, but layers are essentially flattened and run on one timeline, in the order that was established in the Flash document. Practically all information originally in the file will be optimized somehow, and any unused Library elements are not exported with the Flash movie. Library assets are loaded into and stored in the first frame they are used in. For optimization, reused assets are saved to the file only once and are referenced throughout the movie from this one area. Bitmap images and sounds can be compressed with a variety of quality settings as well.

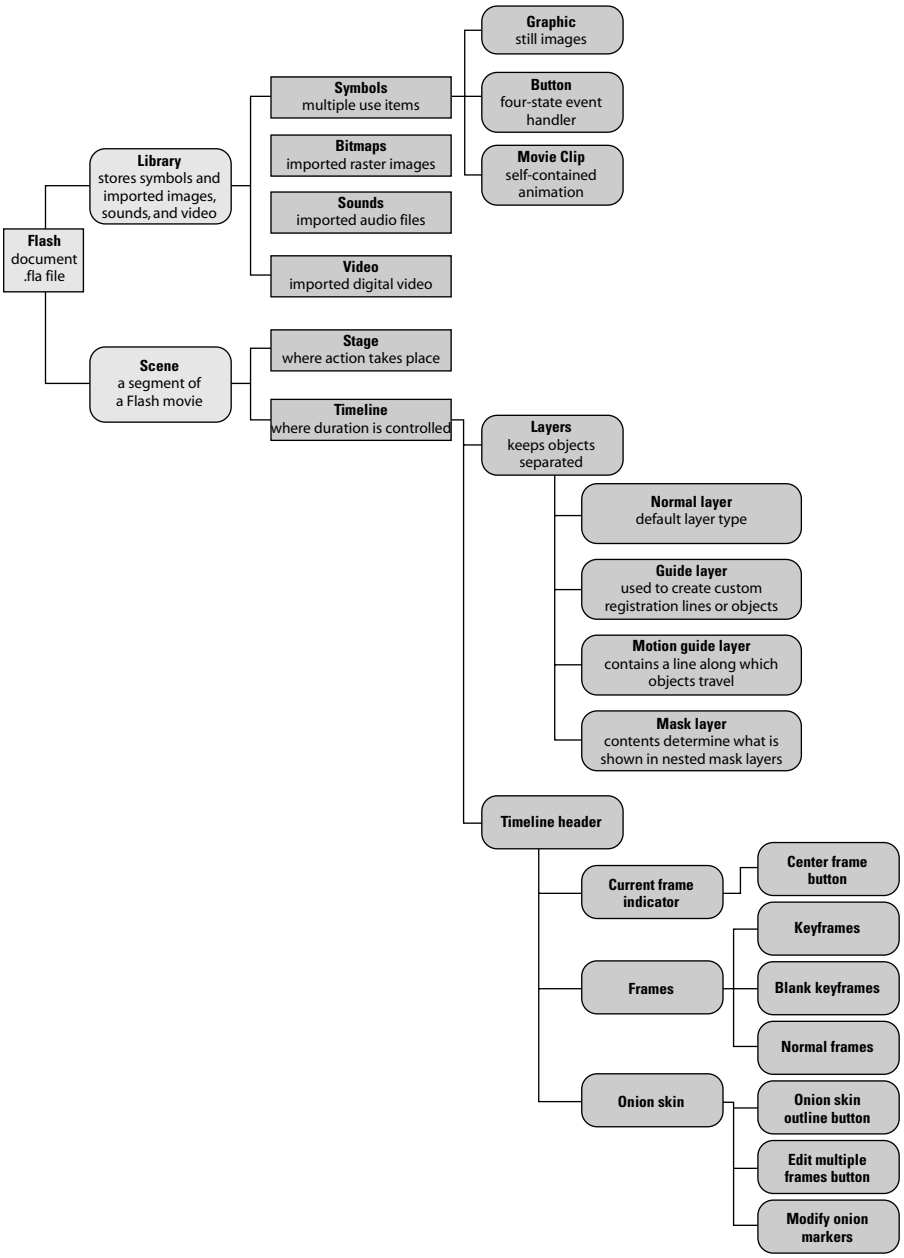
TIP **Flash Player 6 and later movies can be optimized with a specialized Compress Movie option that is available in the Flash tab of the Publish Settings dialog box (File➪Publish Settings). When you apply this option, you see drastic file-size savings with movies that use a significant amount of ActionScript code. By default, Flash Player 10 movies automatically have this compression feature enabled.**

See Figure 1.2 for a graphic explanation of the characteristics of the Flash movie file (.swf) format.

CROSS-REF **We discuss Flash Player detection in detail in Chapter 21, "Integrating Flash Content with Web Pages."**

FIGURE 1.1

Elements of a Flash document (.fla) in the authoring environment



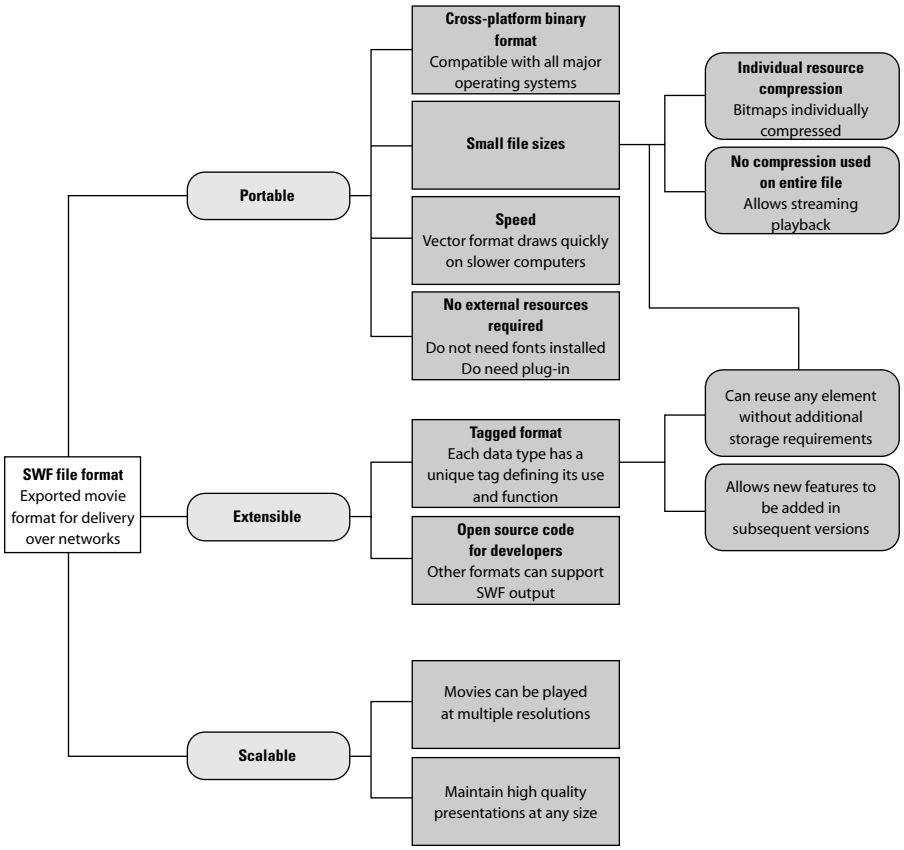
There are several other ways in which Flash movies, or their parts, can be played back or displayed. Since Flash 4, the Publish feature has offered provisions for the export of movies or sections of movies to either the QuickTime digital video format, the QuickTime Flash layer vector format, or the Animated GIF format. Parts of movies can also be exported as a series of individual bitmaps or as vector files. Single frames can also be exported to these formats.

Flash ActionScript files

ActionScript is the programming language used within Flash CS4 documents to create interactive functionality within the movie. You can store ActionScript code in external text files with the .as file extension. You can open .as files directly in Flash CS4 or your preferred code editing application, such as Adobe Flex Builder. ActionScript files can be compiled into a Flash movie by using the `#include` directive or the `import` keyword.

FIGURE 1.2

Overview of the Flash movie (.swf) format



Using Flash Player Terminology

The difference between the naming conventions of the Flash Player plug-in and the Flash authoring software is potentially confusing. Adobe refers to its latest release of the player as Flash Player 10, tagging the version number at the end of the name rather than following the naming convention of some of its predecessors (that is, "Flash 5 Player"). One probable reason the Flash Player is numbered, rather than dubbed "CS" like the authoring software, is because a standard sequential number is required for plug-in detection.

When you publish Flash content to a Web site, don't be tempted to instruct visitors to download and install the "Flash CS4 Player." In versions past, you might have seen sites that required the "Flash MX Player." This terminology is confusing and misleading because there is no "Flash CS4 Player" for users to download. Always refer to the version number of the Flash Player, not the authoring tool.

Flash video files

The Flash Video file format (.flv file extension) and AVC/H.264 video files (.f4v file extension) are used for any video content played within the Flash Player. This file extension is used by any tool that creates Flash Video content, such as Adobe Media Encoder, Sorenson Squeeze, or On2 Flix. You cannot open .flv files in the Flash CS4 authoring tool, but you can import them into a Flash document file (.fla) or you can load them at runtime into Flash Player 7 or later movies. Flash Video files can also be uploaded to an Adobe Flash Media Server application and streamed in real time to Flash Player 6 or later movies.

NEW FEATURE **You can download the new Adobe Media Player from** `www.adobe.com` **to play FLV, F4V, and compatible M4V, MP4, or MOV files.**

Flash Component files

The Flash Component file format (.swc file extension) is used for compiled clips included with Flash CS4 or that you purchase from third-party vendors or download from Adobe Exchange (`www.adobe.com/exchange`). You can't directly open a .swc file in the Flash CS4 authoring environment, but you can copy .swc files to your local settings for Flash CS4 so that the components show up in the Components panel. On Windows, you can copy .swc files to the following location (note that ↩ denotes a continuation of the directory path):

```
C:\Documents and Settings\[Your User Name]\Local Settings\Application ↩
Data\Adobe\Flash 8\en\Configuration\Components
```

On the Mac, you can copy to this location:

```
[Startup disk]\Users\[Your User Name]\Library\Application Support\ ↩
Adobe\Flash CS4\en\Configuration\Components
```

These locations are only used to store additional components; the default components for Flash CS4 are stored in the Flash CS4 application folder.

NEW FEATURE **In Flash CS4, you can also use SWC files that class packages, and specify them in your classpath for ActionScript 3.0 documents.**

NOTE **The Flash Project file format (.flp file extension) is no longer used in Flash CS4. If you have FLP files from previous versions of Flash, you need to build a new project in the updated Project panel in Flash CS4 and link to your old project's files. For more information, read Chapter 3, "Planning Flash Projects."**

The Many Worlds of Flash CS4

Flash is a hybrid application that is like no other application. On the immediate surface, it may seem (to some) to be a simple hybrid between a Web-oriented bitmap handler and a vector-drawing program, such as Adobe Illustrator. But although Flash is indeed such a hybrid, it's also capable of much, much more. It's also an interactive multimedia-authoring program and a sophisticated animation program suitable for creating a range of animations — from simple Web ornaments to broadcast-quality cartoons. As if that weren't enough, it's also the host of a powerful and adaptable scripting language.

Over the past decade, ActionScript has evolved from a limited drag-and-drop method of enabling animation to a full-fledged object-oriented programming language very similar to JavaScript. Flash ActionScript can work in conjunction with XML (e*X*tensible *M*arkup *L*anguage), HTML, and many other applications and parts of the Web. Flash content can be integrated with server-side technologies, including but not limited to Web services, remoting services (AMF, or Action Message Format), and Adobe Flash Media Server. The Flash Player offers built-in support for dynamically loading images, MP3s, video, and other data. Flash can work seamlessly with just about any Web application service, including Adobe ColdFusion, PHP, Microsoft .NET services, and XML socket servers, to deliver streamlined dynamic interactive experiences.

So, what's this evolving hybrid we call Flash really capable of? That's a question that remains to be answered by content creators such as you. In fact, we're hoping that you will master this application and show us a thing or two. That's why we've written this book: to put the tool in your hands and get you started on the road to your own innovations.

Because Flash is a hybrid application capable of just about anything, a good place to start working with this powerhouse is to inquire "What are the components of this hybrid? And if they were separated out, how might their capabilities be described?" Those are the questions that we answer in this chapter.

Bitmap handler

In truth, Flash has limited capabilities as an image-editing program. It is more accurate to describe this part of the Flash application as a bitmap *handler*. Bitmap images are composed of dots on a grid of individual pixels. The location (and color) of each dot must be stored in memory, which makes this a memory-intensive format and leads to larger file sizes. Another characteristic of bitmap images is that they cannot be scaled without compromising quality (clarity and sharpness). The adverse effects of scaling an image up are more pronounced than when scaling down. Because of these two drawbacks — file sizes and scaling limitations — overuse or overdependence of bitmap images may reduce the speed at which your Web site loads into a user's browser. However, for photographic-quality images, bitmap formats are indispensable and often produce better image quality and lower file sizes than vector images of equivalent complexity.

Vector-based drawing program

The heart of the Flash application is a vector-based drawing program, with capabilities similar to Adobe Illustrator. A vector-based drawing program doesn't rely upon individual pixels to compose an image. Instead, it draws shapes by defining points that are described by coordinates. Lines that connect these points are called paths, and vectors at each point describe the curvature of the path. Because this scheme is mathematical, there are two distinct advantages: Vector content is significantly more compact, and it's thoroughly scalable without image degradation. These advantages are especially significant for Web use.

Vector-based animator

The vector animation component of the Flash application is unlike any other program that preceded it. Although Flash is capable of handling bitmaps, its native file format is vector-based. So, unlike many other animation and media programs, Flash relies on the slim and trim vector format for transmission of your final work. Instead of storing megabytes of pixel information for each frame, Flash stores compact vector descriptions of each frame. Whereas a bitmap-based animation file format struggles to display each bitmap in rapid succession, the Flash Player quickly renders the vector descriptions as needed and with far less strain on either the bandwidth or the recipient's machine. This is a huge advantage when transmitting animations and other graphic content over the Web.

Video engine

The Flash Player plug-in can be considered one of the world's smallest video plug-ins. Flash Player 10 amazingly includes three primary video codecs for rendering video files: Sorenson Spark (Flash Player 6 or later), On2 VP6-E (Flash Player 8 or later), On2 VP6-S (Flash Player 9 Update 3 or later), and AVC/H.264 (Flash Player 9 Update 3 and later). Each generation of video codec increases the compression and image quality possibilities for your video content. You can import source video files directly into Flash CS4 document files (.fla), or create separate video files (.flv, .f4v, .mp4) that load into your Flash movies. Users do not need to have Apple QuickTime, Real Network's RealPlayer, or Microsoft Windows Media Player installed in order to view video in a Flash movie. The Flash Player provides a seamless solution.

CROSS-REF **To learn more about this exciting aspect of Flash authoring, refer to Chapter 16, "Displaying Video." We also discuss the new Adobe Media Encoder CS4, an application designed to create the high-quality video content.**

Audio player

Since Flash Player 6, Flash movie files (.swf) have had the capability to load MP3 files during runtime. You can also import other audio file formats into a Flash document file (.fla) during authortime. Sounds can be attached to keyframes or buttons, for background tracks or sound effects. A sound file's bytes can be distributed evenly across a timeline so that the .swf file can be progressively downloaded into the Flash Player, enabling a movie to start playing before the entire sound file has been downloaded.

NOTE **A runtime file is one that loads when the Flash Player is running in its host environment, such as a Web browser or the test movie window of Flash CS4. An authortime file is one that is imported into your Flash document while you're using Flash CS4.**

Multimedia authoring program

If the heart of Flash is a vector-based drawing program, then the body of Flash is a multimedia-authoring program (or authoring *environment*). Flash document files (.fla) can contain multiple media assets, including sound, still graphics, animation, and video. Moreover, Flash is a powerful tool for creating truly interactive content because it enables you to add ActionScript commands to dynamically control movie file (.swf) playback. Whether you are designing simple menu systems or customized and intuitive experimental interfaces, Flash content can be authored to recognize and respond to user input.

Animation sequencer

Most multimedia-authoring programs have a component for sequencing content as animation, and Flash is no exception. But in Flash, the animation sequencer is the core of the authortime application. The Timeline window controls the display of all content — static or animated — within your Flash project. Within the Timeline window, there are two areas that enable you to organize content in visual space and in linear time.

Layers and layer folders enable you to keep track of content that has been placed into your Flash document. The visibility of each layer can be controlled independently, making it easier to isolate specific elements as you are authoring. Layers are viewed from front to back within each frame of the Timeline — items on upper layers overlay other items on lower layers. Any number of items can be placed on a single layer, but you have less control over the stacking order within a layer. Within the same layer, ungrouped vector lines and shapes will always be on the bottom level, whereas bitmaps, text, grouped items, and symbol instances will be on the upper level.

TIP **Flash CS4 documents can use Layer folders. This is invaluable for organizing projects that involve many separate elements.**

CROSS-REF **For a detailed tour of the Flash CS4 environment, refer to Chapter 4, "Interface Fundamentals." We discuss the process of making artwork and managing groups and symbols in Chapter 5, "Drawing in Flash," and in Chapter 6, "Symbols, Instances, and the Library," respectively.**

The structure that creates the illusion of movement in a Flash movie is a series of frames. Each frame represents a still moment in time. By controlling how the playhead moves through these frames, you can control the speed, duration, and order of an animated sequence.

By changing the content in your layers on each frame, you can manually create frame-by-frame animation. However, one of the things that makes Flash such a popular animation machine is its ability to auto-interpolate or *tween* animation. By defining the content on a beginning and an end keyframe and applying a motion tween or a shape tween, you can quickly create or modify animated shape transformations and the movement of elements on the Stage.

CROSS-REF **We discuss the many ways of creating Flash animation in Part III: "Creating Animation and Effects."**

Within one Flash document, you can also set up a series of separate scenes; each scene is a continuation of the same Main Timeline, but scenes can be named and reordered at any time. Scenes play through from first to last without interruption unless Flash's interactive commands ("actions") dictate otherwise.

CROSS-REF **We introduce the steps for using ActionScript for simple control of movie playback in Part V: "Adding Basic Interactivity to Flash Movies."**

Programming and database front end

The past few versions of Flash brought a vast expansion of the possibilities for integrating Flash interfaces with server-side technology and dynamic loading of content by using XML and server technologies such as Adobe ColdFusion, PHP, Microsoft .NET, JSP, Flash Remoting, and Adobe Flash Media Server. These improvements largely came out of the development and maturity of ActionScript as a viable programming language. Flash has developed into an alternative front end for large databases, which means it can serve as an online store, MP3 player, or multiuser game and chat room — an amazing feat for an "animation program!"

With Flash CS4 there are virtually infinite possibilities at your fingertips. Using the components that ship with Flash CS4, you can tap advanced data structures and display them in a Flash movie. You can load JPEGs, GIFs, PNGs, MP3s, and Flash Video files into Flash at runtime (or "on-the-fly"), without having to use a special server technology. You can use a wide range of data formats, from XML to Web Services (SOAP) to Flash Remoting.

There are many other enhancements to the programming environment and functionality of Flash that experienced users will appreciate and new users will come to value. ActionScript 3.0 continues the evolution of Flash's scripting language to a mature format, more closely adhering to ECMAScript 4. These changes support ActionScript's move toward acceptance as a standard, object-oriented programming (OOP) language on its own.

If you consider yourself a computer programmer (especially one who learned how to program in another programming language), you will likely want to try out Adobe Flex Builder 3. Flex Builder is the premiere authoring tool for enterprise-level Web applications running on the Flash platform.

Desktop application authoring program

You can now create your Flash content as an Adobe AIR package for deployment as a desktop application. What is AIR? AIR stands for *Adobe Integrated Runtime*, and it's a framework that enables your Flash content to run as an installed application, just like any other application on your desktop such as Microsoft Word! After a user has downloaded the AIR installer from Adobe's Web site (around 15MB), the user can install AIR applications from any Web site. AIR applications can utilize Flash content (SWF, and all of its supported runtime formats such as MP3, JPEG, PNG, and so on), HTML content (AIR has its own Web rendering engine), and PDF files.

Summary

- Flash CS4 combines many of the key tools for multimedia authoring into one nimble program. The integration it facilitates with other programs and languages promotes better Web content and more advanced applications.
- Flash content is not only found on the Web. For example, it is also used for CD/DVD-ROM authoring, broadcast graphics, offline interfaces, and business presentations.
- Flash CS4 is a multifaceted application that can create a wide range of interactive products for the ever-growing variety of Web-enabled devices that surfers use to access the Internet.
- Careful planning of Flash development will undoubtedly save you time and effort in the long run.