The Essential Guide to Flash CS4 AIR Development

Marco Casario with Andrew Shorten,
Koen De Weggheleire, and Matteo Ronchi

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To the memory of my grandmother Maria.

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FOREWORD

It's been over a decade since FutureSplash, the predecessor to Macromedia Flash, and then later Adobe Flash, was first released; who could have imagined back then that a simple vector-based animation tool would evolve to become a robust platform for delivering expressive content, rich Internet applications, and high-quality video across a multitude of browsers and operating systems.

Today, Flash encompasses more than just a browser plug-in and corresponding authoring tool; the Flash platform provides web, desktop, and mobile runtimes, together with frameworks, tools, servers, and services to enable designers and developers to create high-impact experiences.

Flash Player remains at the core of the platform, with each release offering new capabilities and further improving performance. Building upon the addition of a new high-performance virtual machine for executing ActionScript code in Flash Player 9, the release of Flash Player 10 adds support for 3D transformations, custom filters and effects, advanced audio processing, and GPU hardware acceleration, enabling an entirely new class of experiences not previously achievable on the Web.

As you look to deliver an engaging experience in a way that is convenient, relevant, and personal to the user, it is important to consider whether the browser is always the most appropriate access point. For example, applications deployed to the browser typically are not available when the user is offline, they are constrained within the browser chrome, they don't allow common application interactions such as drag-and-drop from the desktop, and they limit access to files and information on the user's local machine. For some applications, these limitations cause user frustration and a desire for a richer solution.

With the release of the Adobe AIR runtime, Flash designers and developers now have the opportunity to build Flash-based applications that run on the desktop, with new capabilities to extend application functionality and overcome some of the limitations experienced when running inside the web browser. Adobe AIR builds upon the features already found in Flash Player, offering, for example, unrestricted local file system access, as well as providing a version of WebKit for rendering HTML content and SQLite for the storage and retrieval of local data.

Expanding your knowledge of the Flash platform to understand the new capabilities provided by the AIR runtime is crucial if you want to deliver the most engaging experiences for your clients.

The Essential Guide to Flash CS4 AIR Development will help you get to grips with the AIR-specific features in Flash Professional CS4 and show how to leverage the new AIR APIs to create desktop applications that will work consistently on Mac, Windows, and Linux operating systems.

If you need inspiration for how you can leverage Adobe AIR, I recommend you visit the Adobe AIR Marketplace (`www.adobe.com/go/marketplace/`), where you will find AIR applications that you can download and try for yourself. Once you've built your own AIR applications, I encourage you to promote them on the AIR Marketplace so that others can discover and enjoy using them—we certainly look forward to seeing what you create!

Andrew Shorten
Platform Evangelist, Adobe

ABOUT THE AUTHORS

Marco Casario is one of the most dynamic developers and consultants in the Adobe world.

He has been passionate about informatics since he was little more than a child and used to program games in Basic for Commodore 64 before dedicating himself, while still very young, to innovative projects for the Web using Flash and Director (as far back as versions 3 and 5).

In 2001, he began to collaborate with Macromedia Italy. Since that year, he has produced and headed a long series of presentations, conferences, and articles, which you can find listed in detail in his blog entitled "Hands on Adobe World" (`http://casario.blogs.com/`), which is currently receiving several thousands of visitors every day.

In 2005, Marco founded Comtaste (`www.comtaste.com/en/`), a company dedicated to exploring new frontiers in rich Internet applications and the convergence of the Web, the desktop, and the world of mobile devices. MobyMobile (`www.mobymobile.com/`) and YouThruBiz (`www.youthrubiz.com/`) are representative of Comtaste's recent work.

Marco is also the founder of the biggest worldwide Flash Lite user group (`http://groups.yahoo.com/group/FlashLite/`) and of AUGItaly (`www.augitaly.com/`), a reference point for the Italian community of Adobe users, in which he carries out the role of content manager for the section dedicated to Flex and AIR (`www.augitaly.com/flexgala/`).

He's a professional speaker who regularly speaks at international conferences like Adobe MAX, Flash on the Beach, Flex Camp, Multi-Mania, FITC, 360 | Flex, AJAXWorld, O'Reilly Web 2.0 Summit, Adobe Live, and many other local events.

His company, Comtaste, is currently busy working on the development of some very ambitious projects concerning banks and financial agencies, and various Flex and Flash Media Server training activities for the creation of rich Internet applications on behalf of companies including Accenture, HP, Capgemini Engineering, and Adobe Systems Software Ireland.

Marco is also the author of the following books: *Adobe AIR Cookbook* (O'Reilly, 2008), *AdvancED AIR Applications* (friends of ED, 2009), and *Flex Solutions: Essential Techniques for Flex 2 and 3 Developers* (friends of ED, 2007).

Contributing Authors

Andrew Shorten is a platform evangelist for Adobe and is passionate about improving the quality, richness, and value of computer-based experiences. Andrew developed web, kiosk, and mobile user interfaces for government and enterprise customers while working at Fujitsu, and has since worked for Macromedia, Microsoft, and Adobe, where he has engaged with designers, developers, web agencies, and organizations to help them deliver rich, engaging, and successful web and desktop experiences.

Koen De Weggheleire is a faculty member of the Technical University of West Flanders (HOWEST) where he teaches Flash platform solutions (Flash, Flex, and AIR) with a smile.

As the Adobe user group manager for Belgium (`www.adobeusergroup.be/`) and an Adobe community expert for Flash, Koen is heavily addicted to the community and inspires it through his blog at `www.newmovieclip.com/`, and by speaking at various events including Adobe MAX, FITC, 360 | Flex, Flashbelt, and Flash on the Beach.

He coordinates the yearly Belgian multimedia conference Multi-Mania (`www.multi-mania.be/`), where thousands of people come together to learn from industry experts and share knowledge.

Koen is a coauthor of *Foundation Flex for Developers: Data-Driven Applications with PHP, ASP.NET, ColdFusion, and LCSD* (friends of ED, 2007). He's currently working on *AdvancED AIR Applications* for friends of ED, and even more AIR books from Koen are on the way.

When there is still some time left, Koen can be found at his company Happy-Banana, together with Wouter Verweirder, doing Flash platform consultancy on advanced award-winning rich Internet applications.

When Koen is not talking ActionScript, you can find him producing music, collecting goodies, eating pizza, or renovating his 100-year-old house.

Matteo Ronchi is a Comtaste consultant. His main job is development in the multimedia and web technology fields. His professional path started in 2000 as a 3D graphics designer for product design and virtual environment visualization. Soon, following his passion for games and Internet technologies, he moved from 3D to web development, mainly using Flash and Director as core technologies. In the last two years, his work has mainly focused on ActionScript and Flex programming. In 2007, he began speaking at international conferences such as Adobe Live, From A to Web, and 360 | Flex, mainly focusing on Adobe AIR development.

Fabio Bernardi has been a web developer since 2003. The passion for programming rich and friendly web applications brought him to investigate more on Flash, ActionScript, and Flex. In 2005 he joined Comtaste, where he's been involved in several international projects. He is channel manager of the Italian Flex user group FlexGala (`www.augitaly.com/flexgala/`), where he's an active contributor. He is an Adobe Certified Professional Flash developer and a consultant for Adobe Italy.

About the Technical Reviewer

Devon Wolfgang is an avid Flash fan(atic) who's been fiddling and tinkering with ActionScript, Flash, Flex, and AIR since the dark web ages of 1999. He recently finished a six-year contract with the US Navy, and now resides in Ireland with his beautiful wife, Deirdre, where he holds the position of senior software developer with vStream Digital Media (`www.vstream.ie/`). When not wildly busy, you might just find him blogging about ActionScript or involved in one of his other preoccupations such as bad movies and bad music at `http://blog.onebyonedesign.com/`.

ACKNOWLEDGMENTS

Writing a book really is a huge undertaking. During the course of the journey, you often have the feeling that you will never reach the end. Not just because in the end you are reduced to working on it at night after a long day at work or during the weekends, but particularly because it is a task that absorbs all of your ideas and requires constant and assiduous concentration. This often brings you to the point of abstracting yourself from reality and putting personal and working relationships with the people around you to the test. It is for this reason that at the end of your work as an author, you realize how much patience your work colleagues, your clients, your partners, and most importantly, your family had to have to not turn their back on you.

I therefore want to acknowledge these people.

Thank you to my mother, who has always believed in me and has always pushed me to improve myself and to see beyond the surface of things. Thank you to my father who has finally come to understand that it is never too late to begin to hang out with his son. Thank you to my brother who for the period of the writing of the book respected all my insufferable requests.

Thank you to my beloved honey, Katia, whose patience was really put to the test. Being near me during the period in which I wrote this book was definitely more difficult than usual, but her unconditional love, support, and help was fundamental to encourage me to go on. Thanks for inspiring me to be my best. I love you, darling.

Thank you Andrew, Koen, Matteo, and Fabio for your help with this book. I am honored to work with you.

Thank you to my business partner Raffaele and my colleagues Emanuele, Constantine, Liviu, Kira, and Francesco, who were often abandoned by my presence but knew how to take care of their own (and often also my) work commitments. We will do great things together.

Thank you to my friends Fabrizio, Renato, Daniele, Juri, Marmotta, and Alessio, who even after all the refusals of their invitations because of this book, have not left my side. A special thanks to Clay Andres, who gave me the opportunity to write this book and whose ideas and corrections have rendered it better. Finally, an enormous thank you to the people who made this book possible and better, and without whose help and tips it could not have been a success—namely Beth Christmas, Damon Larson, Katie Stence, and the staff behind the scene at friends of ED. They are all passionate people whose primary job is to publish the very best content.

INTRODUCTION

If you want to learn more about AIR development using Flash CS4 and ActionScript 3, this is the book for you. You'll learn the AIR APIs for creating desktop applications with these technologies, and you'll learn to build them using object-oriented programming techniques. Whether you are a Windows, Mac, or Linux developer, this book will be useful for you, since Adobe AIR is a cross-platform desktop runtime, and the examples in this book are intended for all platforms. Throughout the chapters, you'll find detailed information that takes into account the differences between the different platforms.

The Essential Flash CS4 AIR Development site

I've created a companion site from which you can download all the code of the chapters and revised content: `http://flashcs4air.comtaste.com/`. The site will also be used for tracking the errata page for the book, so make sure to check back frequently for any updates.

What you need

In order to follow and create the examples shown in this book, you'll need the Flash CS4 authoring tool. You can download a 30-day trial here: `www.adobe.com/products/flash/`. You'll also need to install the AIR 1.5 runtime from `wwww.adobe.com/go/air`. Finally, all the examples used in this book are downloadable from `http://flashcs4air.comtaste.com/`.

AIR resources

Each topic in this book is presented in the context of an applied solution. Although a brief introduction exists for each solution, this book is not intended as a reference or documentation book.

The official Adobe AIR documentation is huge and very well written. It covers all the aspects of official Adobe AIR in a comprehensive way. You can download the complete official Adobe AIR documentation for free at `http://www.adobe.com/support/documentation/en/air/`.

Another important resource is the Adobe Flex Doc Team blog, where you'll find updates, new content, and other helpful information: `http://blogs.adobe.com/flexdoc/`.

Here is a list of useful resources dedicated to AIR:

- Adobe AIR Market place: `http://www.adobe.com/go/marketplace`
- `http://feeds.adobe.com`
- `Adobe AIR Developer Center Feed: http://rss.adobe.com/developer_center_air_tutorials.rss?locale=en`
- `http://adobe.com/devnet/air/`
- `http://onair.adobe.com/blogs/videos/`
- `http://tech.groups.yahoo.com/group/flexcoders/`
- `http://InsideRIA.com`
- `http://casario.blogs.com`
- `http://flexsolutions.comtaste.com/`

Questions and contacts

Please direct any technical questions or comments about the book to `flexsolutions@comtaste.com`. For more information about other Flex books, see the friends of ED website, at `www.friendsofed.com/`.

Layout conventions

To keep this book as clear and easy to follow as possible, the following text conventions are used throughout.

Important words or concepts are normally highlighted on the first appearance in **bold type**.

Code is presented in `fixed-width font`.

New or changed code is normally presented in **`bold fixed-width font`**.

Pseudocode and variable input are written in *`italic fixed-width font`*.

Menu commands are written in the form Menu ➤ Submenu ➤ Submenu.

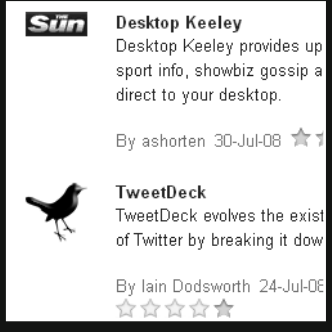
Where I want to draw your attention to something, I've highlighted it like this:

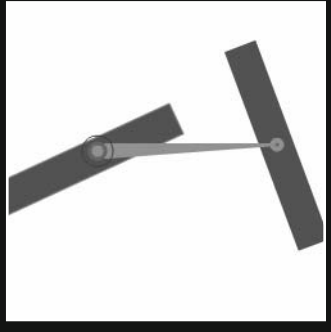
> *Ahem, don't say I didn't warn you.*

Sometimes code won't fit on a single line in a book. Where this happens, I use an arrow like this: ➥.

```
This is a very, very long section of code that should be written all ➥
on the same line without a break.
```

CHAPTER 1
INTRODUCING ADOBE AIR





In 2007, Adobe launched Apollo, the code name for a cross–operating system runtime that allows developers to leverage their existing web development skills to build and deploy rich Internet applications (RIAs) to the desktop.

With this runtime, web developers can leave the browser and its limitations, dictated by sandbox security, and add native functions of desktop applications that communicate and interact with Windows, Mac OS X, and Linux operating systems. The final version of Adobe's technology became AIR (Adobe Integrated Runtime).

Following are the ways in which AIR has added value over its natural competitor JRE (Java Runtime Environment):

- You can use it to create applications from scratch easily.
- You can port web applications to the desktop.
- You can deploy on different operating systems.

To create a desktop application with AIR, designers and developers don't need to learn a new language or development environment. They can create desktop applications using the same knowledge they use every day for web applications. Whether they use HTML, CSS, JavaScript, Ajax, ActionScript, or MXML, Adobe AIR can accommodate them and display the application on the desktop. And that's why learning another IDE (integrated development environment) isn't required. You can use Dreamweaver, Flash, Flex, Eclipse, Aptana, or any other environment that can use these languages. This also means that bringing a web application developed with Ajax or ActionScript (Flash or Flex) onto the desktop requires minimum effort apart from adding functions, which are provided by AIR SDKs (software development kits) to interact with the operating system.

Sun's "write once, run anywhere" motto has often shown its weakness in deploying desktop applications made with Java on different operating systems. Too many times, developers have had to rewrite entire pieces of code or find workarounds to make Java desktop applications work on Windows, Linux, or Mac OS X. With AIR, the time spent porting the application to different operating system will be null.

And if you don't believe what I'm telling you, you can trust Adobe's guarantee, which has already proved it can make any SWF (Shockwave Flash) application visible on Windows, Linux, Mac, and Sun Solaris. Check it out yourself at `www.adobe.com/products/flashplayer/`.

With the recent release of Flash CS4, Adobe provides an even more efficient tool to write ActionScript 3 code that can be exported natively not only as a web application in SWF format, but also as a desktop application in AIR format.

Congratulations on your choice to create a new generation of desktop applications with Flash CS4 and AIR. In this chapter, you'll learn the difference between developing a web and a desktop application using the AIR runtime.

Understanding the difference between browser and desktop applications

Browser or **web applications** are programs that work with an active Internet connection and that are loaded in a web browser. Facebook (`www.facebook.com/`) is an example of a well-known web application.

Desktop applications, on the other hand, are launched directly from a local computer, and don't necessarily require an Internet connection. OpenOffice Writer (`www.openoffice.org/`) is an example of a desktop application.

A few application features for the browser and the desktop are compared in Table 1-1.

Table 1-1. Comparison between a browser application's characteristics with those of a desktop application

Feature	Browser Apps	Desktop Apps
Internet	Required	Not necessary
Installation	None	Must be installed on the local system
Application management	Easy update	Update manager APIs
OS support	Multiple platforms	Multiple platforms
I/O support	None	File system access
Access to OS	Limited	Data stored locally via file access

As you can guess from this table, desktop applications can have more advanced functions that interact and integrate better with the local system than web applications.

Desktop and web applications are both widely used every day, so you can see how it would be advantageous to combine the features of the two. Doing so creates a single environment for developing hybrid applications. An early example of this was BuzzWord, a formerly web-only word-processing tool later released as an AIR desktop application (originally created by Virtual Ubiquity, BuzzWord was recently acquired by Adobe). The BuzzWord desktop application (shown in Figure 1-1) allows you to open and edit documents locally. Visit `https://buzzword.acrobat.com/` to learn more about BuzzWord.

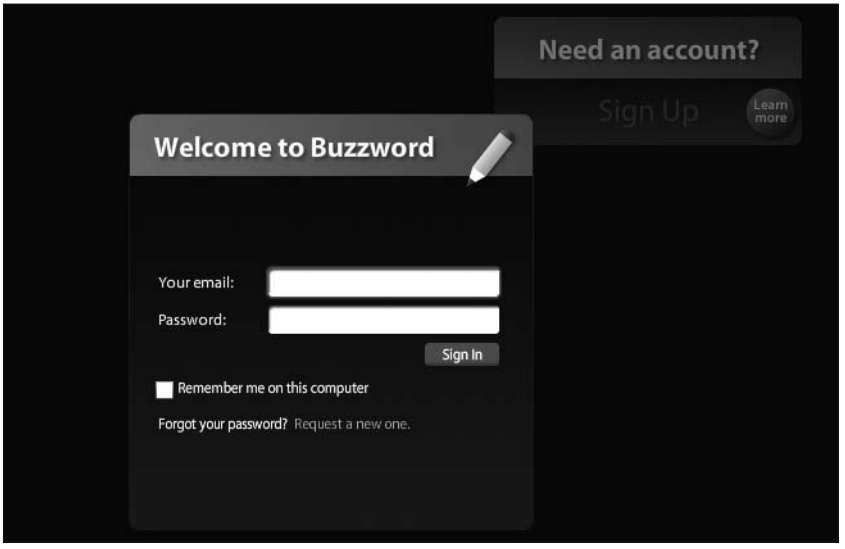


Figure 1-1. You can download BuzzWord from the Acrobat website.

With technologies like AIR, creating desktop applications that can interact with the operating system as well as easily access remote data is quite easy and fast. Maybe the era of "occasionally connected applications" has really arrived.

> *Occasionally Connected Computing (OCC) is a term coined by Macromedia and used to describe some aspects of a web application when not connected to the Internet. This is sometimes a feature of a rich Internet application. (Read more on Wikipedia at* `http://en.wikipedia.org/wiki/Occasionally_Connected_Computing`*).*

In the next section of the chapter, you'll learn what's behind the AIR runtime and how to install the SDK to start developing applications.

Installing AIR and its SDKs

To be able to install and use AIR applications, you'll need the AIR runtime installed locally. The AIR runtime is free, and for Windows, you can download it from Adobe at `http://get.adobe.com/air/`. For other systems, you can download the runtime from `http://get.adobe.com/air/otherversions/`. Figure 1-2 shows this download page on the Adobe site.

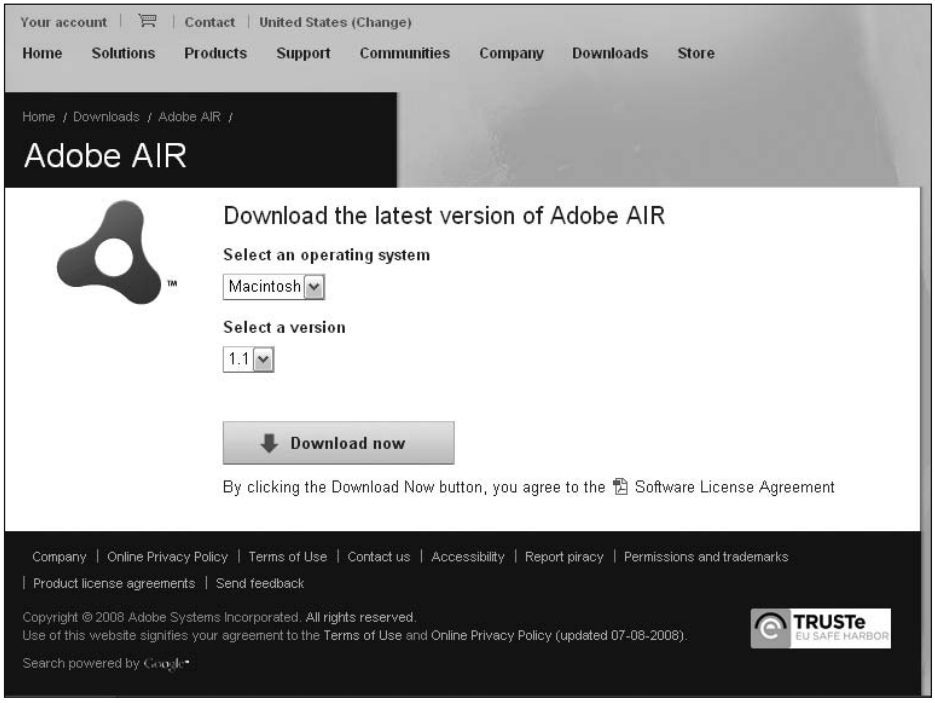


Figure 1-2. Download and install the AIR runtime for your system.

Installing the runtime

Once you've downloaded the runtime, you can install it on your machine using the installation wizard. After you've done this, you'll be able to install and execute AIR applications.

Also on the Adobe website, you'll find the Adobe AIR Marketplace (shown in Figure 1-3) at the following address: `http://www.adobe.com/cfusion/exchange/index.cfm?event=productHome&exc=24&loc=en_us`. Here you'll find a list of applications you can download and install to help you understand what you can actually do (and what has already been done) with AIR technology.

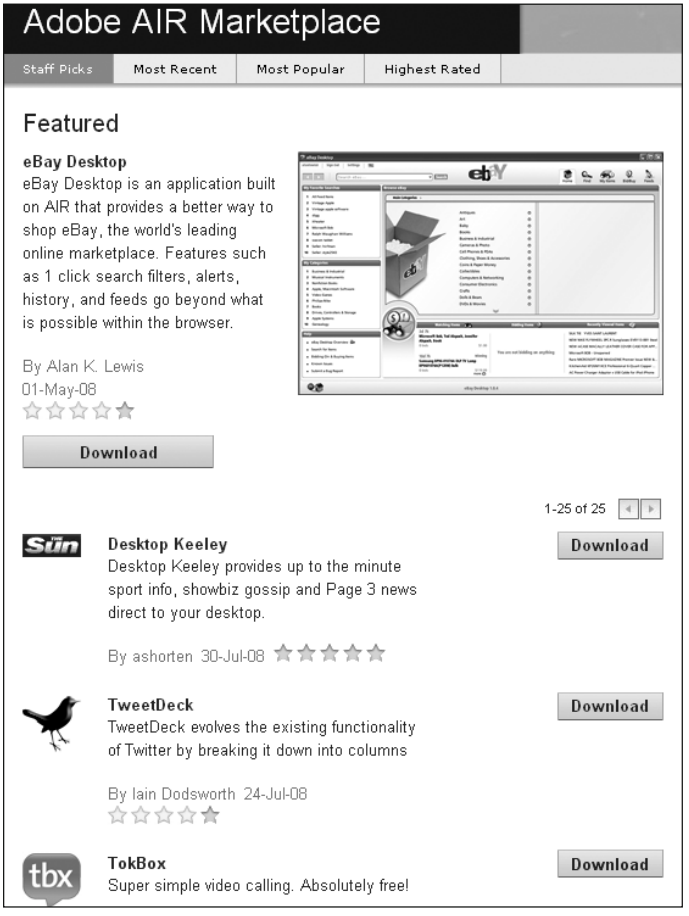


Figure 1-3. You'll find many applications for inspiration in the Adobe AIR Marketplace.

Before you install AIR, I recommend that you can meet the following system requirements:

- For Windows systems
  - Intel Pentium 2GHz or faster processor
  - Windows Vista Home Premium, Business, Ultimate, or Enterprise; Windows XP with Service Pack 2 or Windows 2000 with Service Pack 4; 512MB of RAM; 32MB of VRAM
- For Mac OS X systems
  - PowerPC G4 1.8GHz or faster processor, or Intel Core Duo 1.33GHz or faster processor
  - Mac OS X v.10.4.9 or later, or 10.5.1 (Intel or PowerPC; Intel processor required for H.264 video)
  - 512MB of RAM; 32MB of VRAM

International language support

Installing an application can intimidate many users. Fortunately, AIR installation and other runtime dialog boxes have been translated into the following languages:

- Chinese traditional
- Chinese simplified
- English
- French
- German
- Italian
- Japanese
- Korean
- Portuguese
- Russian
- Swedish
- Dutch
- Czech
- Polish
- Turkish
- Spanish

The language used for the installation wizard will be taken from the language used by the local operating system. This means that if you have Windows installed in English, the AIR installation wizard will show English labels. Moreover, you can develop your AIR application to support the following:

- Building internationalized applications, including keyboard input for double-byte languages
- Localizing the name and description attributes in the application descriptor file
- Localizing error messages, such as `SQLError.detailID` and `SQLError.detail➥Arguments`, in the SQLite database
- Obtaining an array of preferred user interface languages as set by the operating system using the `Capabilities.languages` property

The WebKit engine embedded in AIR

The AIR runtime allows you to load the three following types of formats and contents through its HTML engine:

- HTML
- JavaScript
- CSS

This is possible thanks to the WebKit engine, which is part of the WebKit Open Source Project (`http://webkit.org/`). This project is the same one used for the Apple WebKit Framework for Mac OS X and Google Chrome.

> *AIR uses the code base directly from the WebKit project, not from Apple's WebKit Framework.*