



Adobe® roadmap for the Flash® runtimes

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This document provides an overview of the Adobe® Flash® runtimes and a roadmap for their development. The primary goal is to provide guidance as well as insight into Adobe's current thinking and plans around core Flash functionality contained within Adobe Flash Player and Adobe® AIR® over a time frame of the next year.

Note: This document is current as of the publication date and contains information that is subject to change. The further out the time frame being discussed, the more uncertain the specifics of the roadmap are. If there are significant changes to plans around items discussed within the white paper, the document will be updated in a timely manner. The latest version of this document can always be found at adobe.com/go/flashplayer_roadmap.

Summary

For the past decade, Flash Player and, more recently, Adobe AIR have played a vital role on the web by providing consistent platforms for deploying rich, expressive content across browsers, desktops, and devices. Beginning as a platform for enabling animation, the Flash runtimes have evolved into a comprehensive multimedia platform, enabling experiences that were otherwise not possible or feasible on the web.

Looking forward, Adobe believes that Flash is particularly well suited for addressing the gaming and premium video markets. Although general motion graphics are increasingly being deployed via standards-based technologies, such as HTML5 and CSS3, Adobe will continue to work to ensure that Flash content can be viewed across a wide range of operating systems.

Flash runtimes

The Flash runtimes refer to the primary runtimes, Flash Player and Adobe AIR, built on top of a set of core multimedia technologies that provide a consistent platform for creating and deploying expressive content and applications that can run across browsers, operating systems, and devices.

Content for the Flash runtimes is primarily developed using the ActionScript 3 language and is packaged as a SWF file or compiled to native formats, which contain multimedia assets and code for execution and display within the Flash runtimes.

The SWF file format is publicly available and may be viewed at adobe.com/go/flashspecs.

Flash runtime core

The Flash runtime core contains the base APIs and functionality that individual runtime distributions are built on top of. The primary runtime distributions are the Flash Player browser plug-in and Adobe AIR, which provide additional APIs and functionality specific to the host environment in which they run.

Unless otherwise specified, this document refers to functionality defined in the Flash runtime core, and applies to the specific runtime distributions that contain this functionality. References to "Flash runtime core" in this document refer to this core Flash functionality shared by the runtime distributions.

References to "Flash runtimes" refer to the runtimes that are built on top of the core Flash functionality. These runtimes include Flash Player (browser plug-in) and Adobe AIR (stand-alone applications).

Adobe Flash Player browser plug-in

The Adobe Flash Player is a browser-based plug-in built on top of the core Flash functionality that provides uncompromised viewing of expressive applications, content, and videos across browsers and operating systems.

References to “Flash Player” and “Flash Player browser plug-in” refer to the Flash Player browser plug-in runtime.

Adobe AIR

Adobe AIR is a desktop and mobile-based runtime built on top of the core Flash functionality that allows developers to create and deploy Flash based content as stand-alone desktop and mobile applications across personal computers, operating systems and devices.

Brief history

Flash Player was originally released in the late 1990s as a browser-based plug-in for displaying simple vector-based graphics and animations. It quickly gained popularity with animators as it provided a rich, creative medium for displaying animations on the web, something that, at the time, was difficult if not impossible to do directly in the browser.

Over time, Flash Player added new features and functionality that greatly expanded what was possible within the player specifically, and on the web in general. Some of these features include:

- o Animation
- o Vector-based graphics
- o Audio (including MP3)
- o Video
- o Microphone and webcam access
- o Low-level bitmap manipulation
- o Binary-based sockets
- o Strongly typed, class-based programming language
- o Hardware-accelerated 2D and 3D content

As new features were added, designers and developers would create new types of content for the web, which in turn ensured that users continued to install and use Flash Player. This became a virtuous cycle. Developers could create new types of expressive content because Flash Player offered new features with a near-universal reach on the web. Flash Player maintained ubiquity as users continued to install Flash Player because it provided access to some of the most expressive content on the web.

In 2008, Adobe released a desktop runtime that contained the core Flash runtime functionality. Named Adobe AIR, the runtime allowed developers and designers to create and deployed Flash based content as stand-alone applications, initially on desktop operating systems and more recently as native applications on mobile devices.

Strategic focus of the Flash runtimes

With the growth of competition in the browser market, browser vendors are increasingly innovating and providing functionality that makes it possible to deploy rich motion graphics directly via browser technologies, a role once served primarily by Flash Player. Increasingly, rich motion graphics are being deployed directly via the browser using HTML5, CSS3, JavaScript and other modern web technologies. Adobe expects that this trend will continue and accelerate, and Adobe will continue to play an active role in this space.

Adobe believes that the Flash runtimes are particularly and uniquely suited for two primary use cases: creating and deploying rich, expressive games with console-quality graphics and deploying premium video.

This focus does not mean that existing content will no longer run, or that Flash cannot be used for content other than gaming and premium video. However, it does mean that when prioritizing work, gaming and premium video use cases will take priority.



Gaming

Games are immersive, interactive content whose users demand best-in-class richness, consistency, performance, and reach. The ability of the Flash runtimes to deliver integrated vector and raster graphics, animation, synchronized dynamic sound, video, and responsive performance across the web makes it the platform for both casual and increasingly complex games on the web.

While Adobe sees increasing interest and promise in HTML-based gaming, in the short to medium term the Flash runtimes provide a number of key advantages and differentiators as a gaming platform, including the following:

- o Near-universal reach on PCs via the Flash Player browser plug-in, and on mobile devices via Adobe AIR
- o Fully hardware-accelerated 2D and 3D rendering support that provide console quality graphics
- o Rich gaming developer ecosystem
- o Robust, object-oriented programming language
- o Ability to quickly add new features and make them available to the widest audience
- o World-class creative and developer tooling including Adobe Flash® Builder®, Adobe Flash® Professional, Adobe Photoshop®, and Adobe Illustrator®

Adobe believes that Flash is the game console for the web providing a foundation that allows game developers to deliver rich games and experiences more easily to more people than any other platform. The Flash Player browser plug-in alone provides frictionless reach to 99% of personal computers with no additional install (on over 1.3 billion personal computers). Adobe AIR allows developers to package their Flash based games as native apps to seamlessly reach smartphones and tablets, including Apple iPhone, Apple iPad, Android smartphones and tablets, and the Kindle Fire.

Adobe is fully focused on creating a robust business around gaming.

The Flash runtimes remove friction and open up the largest possible audience for game developers to deliver and monetize exciting games. The largest game publishers make billions of dollars each year by investing in Flash based games. Games are often the richest, most demanding interactive experiences. Adobe believes that the rapid innovation and consistent reach uniquely possible via Flash will continue to make it exceptionally well suited for gaming.

You can find more information about Adobe and gaming at gaming.adobe.com.

Premium video

Adobe Flash has enabled explosive growth in online video by providing a high-quality, secure, and consistent platform for publishing and playback across browsers and operating systems. Flash is the “video engine” of online video, providing high quality and consistent codecs, streaming protocols, and content protection technologies. In addition, Flash provides developers with low-level access that allows them to program custom behaviors and protocols, which is otherwise not possible through a higher-level API.

Adobe believes that Flash has a number of fundamental and unique advantages for video:

- o Single and consistent player and codec support across browsers, platforms, and operating systems
- o Support for content protection (single DRM), which enables premium video content to be licensed for online distribution
- o Mature, full-featured, proven solution that provides a “mission-critical” video platform for premium content owners, including support for ad insertion and analytics via Adobe’s Project Primetime.

Online video is still in its early stages of development, and Adobe believes the pace of broadcast and premium content being made available online will continue to accelerate. Where previously content creators and publishers needed to consider the needs of television and desktop viewers only, now they must address consumption across tablets, phones, smart TVs and other video streaming devices. Adobe is focusing its efforts in this area with Project Primetime.

Adobe’s Project Primetime provides a single video publishing, monetization and analytics solution for programmers and operators, providing both client and server technologies that allow content publishers to reach customers



regardless of where or how they are viewing content. Adobe's Project Primetime supports multiple streaming formats, including HDS and HLS today—and soon DASH—with turnkey Adobe Access DRM integration.

Adobe is also working on providing Digital Home OEMs and other third-party electronics manufacturers with an embeddable version of Primetime Media Player (PMP). PMP will permit programmers and operators to stream HDS and HLS—and soon DASH—to Internet-connected Digital Home devices, with full Adobe Access DRM protection using JavaScript APIs to write their video player.

Adobe's advanced video solutions leverage the Flash runtimes as well as native mobile players to provide a secure, frictionless way to deliver high-quality content across a broad range of devices. Adobe's monetization technologies enable content owners to extract the most value from their video by providing dynamic ad insertion, advanced analytics, quality of service metrics (QoS), and audience segmentation.

Technology roadmap

This section contains a roadmap for Flash runtime releases and features over the next year. This document will be updated as we continue to define and extend this roadmap beyond the time frame reflected below. The information is provided as a guide to help developers and content providers understand the high-level direction of the Flash runtimes, as well as specific features that are being planned or considered.

Please note that the roadmap represents Adobe's current plans and thinking around the Flash runtimes, and is subject to change. The further into the future a planned release is, the more likely specifics around that release will change.

This document will be updated as information and plans change.

Adobe AIR

In the past, Adobe AIR and the Flash Player browser plug-in have followed similar but separate paths. Generally, new Flash APIs and capabilities would be released via the Flash Player plug-in first, and then eventually included in an Adobe AIR release. Moving forward, Adobe AIR and Flash Player browser plug-in releases will be increasingly synchronized and released simultaneously.

Adobe AIR 3 added the ability for developers to extend the API surface and functionality of the runtime by bundling native extensions into their applications. These extensions are written in lower level languages, and can provide access to features and functionality not exposed via Adobe AIR.

Adobe AIR 3 added the ability to package and distribute a captive AIR runtime with the AIR distributable file. This allows the application to run independent of any version of Adobe AIR that may be installed on the system. Adobe recommends that all AIR content be distributed using a captive runtime, and not rely on an AIR runtime being installed in order for the application to run.

Future Adobe AIR development will focus on incorporating features from the Flash runtime core. While desktop and mobile-specific APIs may be developed, they will not be the primary focus for Adobe AIR development efforts. Developers requiring functionality not available directly via Adobe AIR APIs should consider adding that functionality via the native extensibility API.

Flash Player 11.2 and AIR 3.2

Flash Player 11.2 and AIR 3.2, released in March 2012, focused on adding features that are key for the gaming and video markets.

Some of the features in the release include the following:

- o Mouse-lock support
- o Right and middle mouse-click support
- o Context menu disabling
- o Hardware-accelerated graphics/Stage 3D support for Apple iOS and Android via Adobe AIR
- o Support for more hardware accelerated video cards (from January 2008) in order to expand availability of hardware-accelerated content.



- o New Throttle event API (dispatches event when Flash Player throttles, pauses, or resumes content)
- o Multithreaded video decoding pipeline on PCs, which improves overall performance of video on all desktop platforms
- o Notification of use of premium features in the debug players; content runs unrestricted in the release players

Flash Player 11.3 and AIR 3.3

Flash Player 11.3 and AIR 3.3, released in June 2012, focused on enabling features and functionality key for the gaming market, as well as addressing popular feature requests from developers.

Some of the features in this release include the following:

- o Keyboard input support in full-screen mode
- o Improved audio support for working with low-latency audio
- o Ability to progressively stream textures for Stage 3D content
- o Protected mode for Flash Player in Firefox
- o Frame label events
- o Support for compressing BitmapData to JPEG and PNG formats
- o Support for Mac OS X App Store application sandboxing requirements
- o Text streaming support for Stage 3D
- o Expanded information about GPU driver details
- o Bitmap draw with quality API (new)
- o Release outside mouse event API
- o Flash Player silent update support for Mac OS
- o Stylus support for Android 4.0 devices (Adobe AIR)
- o USB debugging for iOS (Adobe AIR)
- o iOS simulator support (Adobe AIR)

Flash Player 11.4 and AIR 3.4

Flash Player 11.4 and AIR 3.4, released in August 2012, focused on enabling features and functionality that are key for the gaming market, as well as addressing popular feature requests from developers.

Some of the features in this release include the following:

- o ActionScript workers (enables concurrent ActionScript execution on separate threads)
- o Support for advanced profiling
- o LZMA compression support for ByteArray
- o Support for hardware-accelerated video cards for Stage 3D expanded to 2006
- o Improved ActionScript performance when targeting Apple iOS
- o Performance index API to inform about performance capabilities of current environment
- o Support for compressed textures with alpha support
- o Support for StageVideo.attachCamera API
- o Support for push notifications for iOS (Adobe AIR)

Premium Features in Flash Player 11.4

This document previously described the implementation of Premium Features in Flash Player 11.4. As of January 2013, the XC APIs (the combination of domain memory APIs and Stage3D hardware acceleration APIs) are no longer classified as a Premium Feature and access no longer requires a separate license from Adobe, nor the payment of royalties. The use of Stage3D APIs in conjunction with the fast-memory opcodes via the domainMemory API will be available as a standard feature without requiring that content creators enter into a separate license agreement with Adobe.

See the Premium Features section below for more information on Premium Features.



Flash Player 11.5 and AIR 3.5

Flash Player 11.5 and AIR 3.5, released in November 2012, focused on performance improvement and stability.

Some of the features in this release include the following:

- o Shared ByteArray support for ActionScript workers
- o Debug stack trace in release builds of Flash Player
- o Various bug fixes

Flash Player 11.6 and AIR 3.6

Flash Player 11.6 and AIR 3.6, released in February 2013, focused on gaming, performance improvements, security enhancements, and stability.

Some of the features in this release included the following:

- o Ability to query graphics vector data at runtime
- o Full-screen permission dialog user interface improvements
- o Ability to load SWFs at runtime when deploying as an AIR application in AOT mode on iOS
- o Finer grained control over supported display resolution on iOS devices when deploying as an AIR application
- o HiDPI support for Flash Professional
- o ActionScript 3 access to fast memory operations/intrinsics

Flash Player 11.7 and AIR 3.7

Flash Player 11.7 and AIR 3.7, released in April 2013, continued to focus on security and stability, while adding features for gaming.

Some of the features in this release included the following::

- o Android captive runtime debugging
- o Support for the OUYA controller
- o Remote hosting of secondary SWF files for iOS
- o Preventing backup of shared objects on iOS for better iCloud support.
- o 16 bit texture support for improved memory management

Flash Player 11.8 and AIR 3.8

Flash Player 11.8 and AIR 3.8, released in July 2013, focus primarily on gaming features but included additional improvements around security and stability.

Some of the features include the following:

- o Recursive stop API on MovieClips
- o GamePad support on desktop browsers and Android.
- o Increase maximum texture size support to 4096 x 4096
- o Support for rectangular textures
- o LZMA compressed SWF support for iOS
- o Datagram and server socket support for AIR on mobile
- o StageVideo for desktop AIR



Flash Player 11.9 and AIR 3.9

Flash Player 11.9 and AIR 3.9, released in October 2013, included additional improvements around security and stability

Some of the features include the following:

- o OSX Mavericks support for desktop Flash Player and AIR
- o ActionScript concurrency for Android (beta)
- o iOS 7 support
- o Support for Windows 8.1 PlayTo
- o Support for Windows 8.1 tab suspension improvements
- o Support for Internet Explorer 11 back navigation caching
- o XXHDPI icon support for AIR Android
- o Mac .pkg installation support for administrators

Flash Player 12 and AIR 4.0

Flash Player 12 and AIR 4, the current releases, focus primarily on gaming features but included additional improvements around security and stability

Some of the features include the following:

- o Significant reduction in iOS packaging times (beta)
- o ActionScript concurrency for Android
- o Improvements to Stage3D
- o Android native extension (ANE) improvements
- o Android KitKat (Android 4.4) support
- o Added support for Internet Explorer 11 on Windows 7

With Flash Player 12 we've introduced a new numbering scheme for our product versions. Adopting the pattern set by Google Chrome and Mozilla Firefox, we will update the major version number with each subsequent major quarterly release.

This change will also apply to the AIR Runtime and AIR SDK. This release was numbered AIR 4 and AIR SDK 4; however, with our "King" (Q2 2014) release, the version number of the AIR Runtime and AIR SDK will be synchronized with the Flash Player version at 13.

Flash Player 13 and AIR 13

Flash Player 13 and AIR 13, released in April 2013, included additional improvements to graphics, security and stability. In addition, with this release both AIR and Flash Player were synchronized using the major version number 13.

Some of the features include the following:

- o Enhanced supplementary character support for the TextField control
- o New Stage3D texture wrapping modes
- o Stage3D anti-aliasing for texture rendering
- o GamePreview support for AIR
- o Relocation of the full screen video warning to the top of the screen
- o Improved iOS packaging engine



Flash Player and AIR 14

Flash Player and AIR 14, released in June 2014, added a new AIR platform with support for Intel x86 Android. In addition new 3D features and gaming support were added.

Some of the features include the following:

- o Anisotropic Filtering for Stage3D
- o New Stage3D "Standard" profile for desktop platforms
- o Intel x86 Android support
- o Continued refinements and improvements to the iOS packaging engine
- o AIR Gamepad support for second screen gaming
- o Flash Player content debugger for PPAPI on Windows and Mac

Flash Player and AIR 15

Flash Player and AIR 15, released in September 2014, focused on improved browser and hardware support, mobile 3d features, and improved video playback

Some of the features include the following:

- o Relaxed Stage3D render target clear
- o Improved support for browser zoom levels on Windows 8
- o Full screen orientation change support for Flash Player Windows
- o Hardware video decoding for Google Chrome (PPAPI) on Windows
- o Automatic software fall back with StageVideo
- o Retina display support for StageText
- o Continued refinements and improvements to the iOS packaging engine
- o AIR Gamepad enhancements
- o AIR Cross promotion for mobile devices

Flash Player and AIR 16

Flash Player and AIR 16, released in December 2014, included new platform support and improvements for 3D content

Some of the features include the following:

- o iOS 64-Bit support for mobile AIR applications
- o Stage3D wireframe mode support for AIR desktop
- o PPAPI Flash Player installers for Windows and Mac Chromium based applications
- o Stage3D standard "constrained" profile support

Flash Player and AIR 17

Flash Player and AIR 17, released in March 2015, included usability improvements for Flash Player and improved compilation time and 3D video texture support for AIR

- o Flash Player Control panel improvements
- o Flash Player installer improvements
- o ADT Packaging time improvements reducing compilation time up to 50 percent
- o Stage3D standard "extended" profile mobile support
- o Video Texture support for AIR on Windows, Mac and iOS



Flash Player and AIR 18

Flash Player and AIR 18, released in June 2015, included installation streamlining and improvements for 3D content

Some of the features include the following:

- o Flash Player installer streamlined to remove requirements to shutdown browsers before installing
- o Flash Player audio APIs added to NPAPI for improved browser interfaces
- o Stage3D standard "extended" profile support added for desktop Flash Player and AIR
- o Flash Player zoom factor support for PPAPI and non-Win8 ActiveX browsers
- o Video Texture support for AIR on Android
- o ETC2 Support for iOS, Android, and desktop AIR
- o Improved TestFlight support
- o Additional ADT packaging time improvements reducing compilation another 20 percent

Flash Player and AIR 19

Flash Player and AIR 19, released in September 2015, included support for iOS concurrency and ActionScript APIs

Some of the features include the following:

- o Support for concurrency in AIR iOS applications
- o Improved Stage3D error messages
- o New insertAt() and removeAt() vector and array APIs
- o Flash Player ability to disable browser zoom factor scaling via HTML
- o App linking for AIR iOS applications

Flash Player and AIR 20

Flash Player and AIR 20, released in December 2015, included support for 64-bit AIR on OSX, updated mobile SDKs and improvements for 3D content

Some of the features include the following:

- o iOS SDK updated for iOS 9 support
- o Android SDK updated using Android SDK 24.3.4
- o Beta channel Flash Player data analytics for quality improvements
- o Added SecureSocket API support for iOS
- o AIR applications now run as 64 bit on OS X
- o Providing video rotation information to ActionScript as meta data
- o Flash Player PPAPI vector printing support added
- o Added the ability to toggle hardware acceleration via settings UI on Edge and IE
- o Stage3D instanced drawing support added



Flash Player and AIR focus for 2016 and beyond

Adobe is continuing to develop and improve both Flash Player and AIR. As we progress forward and commit items to our quarterly releases, we will update the release timing for these features in this document. In 2016, we will continue the attention that we give to the following:

Security

Security remains our top priority and we will responsibly address security related issues. In addition, we will continue to pro-actively investigate and implement changes to reduce the attack surface for Flash Player and AIR.

Quality and Performance

The Flash runtime components are used by hundreds of millions of people on a daily basis for all facets of their online life. Thousands of businesses depend on the Runtime for success in the market place. We realize that our customers rely on rock solid stability and seamless performance. We will solve critical problems if and when found and we will continue to focus on improving the quality and performance of the runtime.

New Features

Based on feedback from our developer community, we've added the following features to our product backlog. We will be working to make these and other items available in future releases.

- o AIR – Media Auto Play for iOS and Android
- o AIR – 64-bit support for Windows applications
- o AIR – Improved HTML5 support
- o AIR – Improved video support on Android
- o AIR – HiDPI support for Windows 8 and Windows 10
- o AIR – Echo cancellation on Android and iOS
- o AIR – iOS9 multitasking and split screen support
- o AIR – Beta support for tvOS and Android TV platforms
- o Flash Player – Support for Browser Zoom Factor in Mozilla Firefox
- o Flash Player – Improved installation and settings UI workflows
- o Flash Player – Simplified LSO UI
- o Flash Player – Improved printing support for PPAPI on OSX
- o Flash Player – HiDPI support for Firefox on Windows
- o Flash Player – Linux PPAPI installers
- o Flash Player – Enterprise installers for PPAPI on Windows and OSX
- o Flash Player – Video Texture support
- o Flash Player – Enterprise configurable LSO and locale properties
- o Flash Player – CORS origin header support
- o Usage data – Runtime data analytics for AIR quality improvements
- o Stage3D – GPU Memory information in Context3D
- o Stage3D – Asynchronous texture upload support
- o Stage3D – Anti aliasing support for mobile devices
- o Stage3D – Support for ATF (JPEG-XR compression) for rectangular textures for Flash Player and AIR
- o Stage3D – Runtime compression of textures for Flash Player and AIR

In addition to these items, we will also continue to evaluate and address feature requests made to our public bug database (bugbase.adobe.com) by our customers.

Flash Player “Next”

Over the past decade, Adobe has played an active role in the development of languages and virtual machines for web-based development. This includes the development and deployment of a number of virtual machines and languages via Flash Player, as well as active contributions and leadership to ECMAScript / JavaScript language drafts and specifications (including the current “Harmony”). Adobe maintains a world-class engineering team focused solely on next-generation virtual machine and language developments for web and multimedia runtimes.



Previous iterations of this document laid out a roadmap for exploratory virtual machine and language innovations from Adobe to be pursued via a rearchitected Flash Player (referred to as Flash Player "Next" and ActionScript "Next"). However, by its nature, this type of architectural innovation is disruptive and generally not backwards-compatible. As Adobe has learned in the past from transitions between generations of virtual machines (from ActionScript 2 to ActionScript 3), this places a high burden on developers who want to take advantage of features and APIs which may only be available via the new runtime, or which may require significant porting of content, frameworks, and libraries. Given this, as well as the growing importance of browser-based virtual machines, Adobe will focus its future Flash Player development on top of the existing Flash Player architecture and virtual machine, and not on a completely new virtual machine and architecture (Flash Player "Next") as was previously planned. At the same time, Adobe plans to continue its next-generation virtual machine and language work as part of the larger web community doing such work on web-based virtual machines.

General information

This section contains general information and guidance around the Flash runtimes.

Premium Features

In March of 2012, Adobe introduced the concept of a premium tier of APIs in Flash Player referred to as Premium Features. In order to leverage the premium APIs within their content, developers are required to enter into a separate license agreement with Adobe. Initially, there was only one API included, referred to as the XC APIs, which consisted of the use of Stage3D in conjunction with fast-memory access via the domainMemory API.

As of January 2013, the XC APIs are no longer classified as a Premium Feature and access will no longer require a separate license from Adobe. Thus the use of Stage3D APIs in conjunction with the fast-memory opcodes via the domainMemory API will be available without requiring that content creators enter into a separate license agreement with Adobe. Developers and publishers that have published content using the XC APIs do not need to make any changes to their content to reflect the change of status for the XC APIs, nor submit royalty payments.

At this time, there are currently no APIs or features designated as Premium Features in the Flash runtimes. However, additional Premium Features may be added in the future.

You can find more information at adobe.com/go/fpl.

Platform support

Adobe publishes a list of supported platforms for each Flash runtime release. The list of supported platforms for each release can be found on the Adobe site, with the most recent list of supported platforms found at adobe.com/products/flashplayer/systemreqs/.

Support for the Flash Player plug-in for browsers and Adobe AIR for PCs and devices may differ. Please refer to their respective release notes for more information.

Personal computers

Adobe is committed to providing both the Flash Player browser plug-in and Adobe AIR for personal computing operating systems. In some cases, Adobe may work with third parties to help in developing and/or distributing Flash runtimes for various browser and operating system configurations.

Apple OS X

Adobe is committed to providing support for both the Flash Player browser plug-in, as well as Adobe AIR for Mac OS X operating systems. On Mac OS X operating systems, Adobe AIR applications can be distributed both directly and via the Mac App Store.

As of Adobe AIR 3.3, Adobe AIR applications can be distributed on the Mac App Store under the new Mac OS X application sandboxing requirements.



Microsoft Windows

Adobe is committed to providing support for both the Flash Player browser plug-in, as well as Adobe AIR for Windows based operating systems.

Windows 8

The most current generation of the Microsoft Windows operating system is Windows 8. The operating system includes a number of different user interface configurations (desktop and Modern UI) and targeted processor chipsets (x86/64 and ARM), which create a number of different development targets for the Flash runtimes. In addition, while Windows 8 Modern UI is the primary interface for tablets and touch devices, it is also a core part of the user experience for Windows 8 running on desktops and laptops.

Flash Player release and debug players are available and supported for Windows 8 Desktop and Modern UI experiences on both x86/64 and ARM platforms.

In order to ensure the best experience for users, Microsoft maintains a compatibility view list of HTML and Flash content that is known to work well in Modern UI style Internet Explorer. As of March 12, 2013, Microsoft has enabled Flash content on IE for Windows 8 and Windows RT to run by default. Flash content may be put on the compatibility view list based on criteria detailed in the MSDN article at adobe.com/go/flash_windows8_guidelines.

Adobe AIR is available and supported for Windows 8 Desktop on x86-based computers. Adobe currently has no plans to support Adobe AIR for Windows 8 Modern UI applications or Windows Mobile.

Adobe and Microsoft are working closely together, and are investing in continuing to deliver Flash Player for Windows 8 and future versions of Windows on both Windows desktop and Modern UI.

Linux

Adobe has been working closely with Google to develop a single, modern API for hosting plug-ins within the browser. The PPAPI, code-named "Pepper", aims to provide a layer between the plug-in and browser that abstracts away differences between browser and operating system implementations. You can find more information on the Pepper API at <http://code.google.com/p/ppapi/>.

Because of this work, Adobe has been able to partner with Google in providing a "Pepper" implementation of Flash Player for all x86/64 platforms supported by the Google Chrome browser. Google now distributes this new Pepper-based Flash Player as part of Chrome on all platforms, including Linux.

For Flash Player releases after 11.2, the Flash Player browser plug-in for Linux will only be available via the "Pepper" API as part of the Google Chrome browser distribution and will no longer be available as a direct download from Adobe. Adobe will continue to provide security updates to non-Pepper distributions of Flash Player 11.2 on Linux for five years from its release.

Flash Player will continue to support browsers using non-"Pepper" plug-in APIs on platforms other than Linux.

Adobe will not be providing a Pepper-based debug player implementation of the Flash Player browser plug-in on Linux.

As of Adobe AIR 3, Adobe has discontinued support for Adobe AIR for Linux operating systems.

Mobile

Flash Player 11.1 is the last release of the Flash Player plug-in for mobile browsers. Adobe will not add support for new mobile device configurations (chipset, browser, OS version, etc.). Adobe will continue to provide critical bug fixes and security updates for existing device configurations through September 2013, and will also allow our source-code licensees to continue working on and releasing their own implementations.

Adobe continues to actively invest in enabling developers to create and deploy Flash based content as mobile (and desktop) applications via Adobe AIR.

Adobe AIR is committed to supporting iOS and Android mobile platforms. At this time we do not have plans to extend this support to new operating systems but we will continue to evaluate these opportunities going forward.



Android

Beginning August 15, 2012, the Flash Player plug-in for mobile browsers on Android will only be available on the Google Play Store for devices certified to run Flash Player which are preinstalled with Flash Player. Flash Player is not supported on Android 4.1 and users should uninstall Flash Player prior to upgrading to Android 4.1.

Developers who need ongoing access to released versions of Flash Player for Android can find them in the archive of released Flash Player versions at adobe.com/go/fp_archives. Installations made from the archive will not receive updates through the Google Play Store.

Flash Player plug-in for Android is not supported or available for the Google Chrome browser on Android.

You can find more information on the Flash Player plug-in for mobile browsers for Android at adobe.com/go/fp_android_update.



Document release history

February 16, 2016

- o Added information on Flash Runtime 19 and 20 releases
- o Added information on Flash Player and AIR for 2016

June 9, 2015

- o Added information on Flash Runtime 17 and 18 releases
- o Added information on Flash Player and AIR for 2015

March 11, 2015

- o Added information on Flash Runtime 13, 14, 15 and 16 releases
- o Added information on Flash Player and AIR for 2015

February 10, 2014

- o Added information on Flash Player 11.8, 11.9, and 12.0 releases
- o Added information on Flash Player and AIR for 2014

August 16, 2013

- o Added information on Flash Player 11.6, 11.7, and 11.8 releases
- o Added information on Flash Player "Irving" and Flash Player "Jones" releases

March 19, 2013

- o Added information on Flash Player "Geary" release
- o Added information on Flash Player "Harrison" release

March 12, 2013

- o General update of document
- o Added information on Flash Player "Folsom" release
- o Updated information on Windows 8 support

January 30, 2013

- o General update of document
- o Added information on availability of the SWF file format
- o XC APIs are no longer designated as Premium Features
- o Added information on Flash Player "Folsom" release
- o Added information on Flash Player "Geary" release
- o Updated information on future Flash Player architecture development
- o Updated information on Windows 8 support
- o Moved information on support for television to video section

November 19, 2012

- o Added new feature information to Flash Player "Folsom" release.
- o Updated "Ellis" section with actual version number (11.5) and referred to it as the current release.

August 21, 2012

- o Added new feature information to Flash Player "Ellis" release.
- o Updated "Dolores" section with actual version number (11.4) and referred to it as the current release.

July 19, 2012

- o Changed the date that Adobe is committed to providing critical bug fixes and security updates for Flash Player plug-in for mobile browsers for existing mobile device configurations through September 2013. (Earlier date of September 2012 was a typo in the original document.)
- o Updated information on "Dolores" release.



- o New ActionScript 3 APIs to access the fast-memory opcodes are no longer being added to the "Dolores" release. The APIs are no longer relevant due to planned improvements for ActionScript execution and APIs in ActionScript "Next".

June 28, 2012

- o Added information on Flash Player plug-in for Android support
- o Added information on timeline for Flash Player plug-in support for mobile browsers

June 22, 2012

- o Added link to Flash Player on Windows 8 Metro developer guidelines
- o Restored information on Adobe AIR support for Windows 8 that was accidentally removed in the previous update

June 1, 2012

- o Added new feature information to Flash "Cyril" release
- o Moved LZMA ByteArray compression from the "Cyril" to the "Dolores" release
- o Moved Release outside mouse event API from the "Dolores" to the "Cyril" release
- o Added information on Windows 8 support

March 28, 2012:

- o Added information to the gaming section on premium features and Adobe's plans for monetizing gaming within the Flash runtimes
- o Added details to the Flash Player 11.2 release about access to the domainMemory API
- o Added features for the "Cyril" release
- o Added features and information for the "Dolores" release
- o Added information about StageVideo in Adobe AIR to the Flash "Next" release

February 23, 2012: Minor corrections and clarifications; no policy or plan changes

February 22, 2012: Initial release

For more information

Flash platform white papers: adobe.com/go/flashplatform_whitepapers

Adobe AIR: adobe.com/products/air.html

AIR Developer Center: adobe.com/devnet/air.html

Flash Player: adobe.com/products/flashplayer.html

Flash Player Developer Center: adobe.com/devnet/flashplayer.html

