Welcome to Adobe® Flash® Player 20 and Adobe AIR 20!

Last Updated: January 19, 2016

Welcome to the latest Flash Runtime version 20 beta! We've been hard at work adding new features to Flash Player and AIR and we're looking forward to receiving feedback from our development and Flash Player community.

This beta release includes new features as well as enhancements and bug fixes related to security, stability, performance, and device compatibility for Flash Player 20 and AIR 20. This document may be updated periodically as more information becomes available.

As always, we appreciate all feedback. We encourage you to post in our beta forums or create bug reports or feature requests on our public bug database.

**Flash Player Beta Forum**
**AIR Beta Forum**
**Bug Database**

**NOTE:**

- The ActiveX Flash Player in this release is not compatible with Windows® 8.x or 10
- Flash Player for Windows® 8.x/10 is available as part of the generally available Windows® 8.x/10 update

**New and Updated Features**

**iOS SDK Upgrade (Starting 20.0.0.206)**

AIR Runtime is now built with iOS 9 SDK which enables AIR developers to use ANEs built with iOS 9 APIs without using the --platformSDK switch while packaging with ADT. App Transport Security (ATS) is being introduced from Apple in iOS 9, which doesn't allow unsecure connections between App and Web services. Due to this change all the connections which are made to unsecure web sites via Loader, URLLoader will discontinue and not work due to App Transport Security. Please specify exceptions to the default behavior by adding keys to InfoAdditions tag of application descriptor of your app.

```
<iPhone>
  <InfoAdditions>
    <![CDATA[
      <key>NSAppTransportSecurity</key>
      <dict>
        <key>NSAllowsArbitraryLoads</key><true/>
      </dict>
    ]]>  
  </InfoAdditions>
```


Android SDK Upgrade

With AIR 20, Android SDK (API Level 21) has been upgraded in AIR Runtime, we're now using the latest Android SDK ie 24.3.4. **Going forward, any application that will be packaged using latest AIR Runtime will not be supported below Android OS 4.0.** For devices below Android OS 4.0, current release of AIR Runtime 19 will continue to be available as is on Google Play store. Any application that will be packaged using latest AIR SDK will be supported on Android OS 4.0 and above. So, if a developer wants to support an application below 4.0 she will have to keep multiple APKs live on Google Play store. Read this to know how to upload multiple APKs on Google Play store. It should be noted that when multiple APKs are live on Play store, any device receives the latest version with which it is compatible.

For Example, in the case below, devices below 4.0 will receive version 1.5 and 4.0 and above will receive version 1.6 of the application.

- Version for 2.3+ app is 1.5
- Version for 4.0+ app is 1.6

And in the following case, since the latest version of the application is 1.7 and is compatible with all devices, here all devices will receive 1.7 version of the application,

- Version for 2.3+ app is 1.7
- Version for 4.0+ app is 1.6

Android TV Support [BETA only]

Starting AIR 20, we have introduced Android TV support for AIR Android applications. Using this feature, developers will be able to develop captive runtime applications that are also compatible with Android TV. Please use swf-version 31 or greater and namespace 20.0 or greater to access this feature. Below mentioned two tags needs to be added in the app.xml file to support Android TV applications:

1. `<supportsAndroidTV>true</supportsAndroidTV>`

   value for the `<supportsAndroidTV>` tag can be either "true" or "false". If this tag is not added, then the default value will be "false".

   `<supportsAndroidTV>true</supportsAndroidTV>` : Application is supported on Android TV and it will reflect on the home screen of Android TV after the installation.

   `<supportsAndroidTV>false</supportsAndroidTV>` : Application is not supported on Android TV and it will not be shown on the home screen of the Android TV. However, it will be reflected in the downloaded apps inside Settings of the device.

2. `<banner>`

   This is the tag where user can give the banner image path. Application Banners represent your app or game on the home screens of TV devices and serve as a way for users to launch the app. The specific requirements for a banner image are 320 x 180 px, .png, xhdpi resource. In case developer does not provide the banner image with `<supportsAndroidTV>true</supportsAndroidTV>` tag, a default banner image will reflect on home screen of Android TV. SDK tools should be updated to version 24.0.0 or higher. In order to access new APIs for TV devices, you must create a project or modify an existing project that targets Android 5.0 (API level 21) or higher. Applications can only be packaged with --target apk-captive-runtime for Android TV. Android TV support is available from AIR SDK 20.0 or higher so namespace need to be added accordingly in app.xml file.

   Sample snippet - Make the below changes in app.xml file parallel to `<containsVideo>` tag:

   ```xml
   <android>
     <manifestAdditions><![CDATA[
     <manifest android:installLocation="auto">
       ..
       ..
     </manifest>
     <supportsAndroidTV>true</supportsAndroidTV>
     <banner>"path of the banner image (320x180 px, .png file)"</banner>
   </android>
   ```
SecureSocket API Support for iOS

In this release we have introduced Secure socket support for AIR iOS applications. Using this feature, developers will be able to make socket connections using the Secure Sockets Layer (SSL) and Transport Layer Security (TLS) protocols. The supported encryption protocols are those higher than SSL 3.0, and TLS 1.0 and higher. SSL version 3.0 and lower are not supported. Secure socket support for iOS is available from AIRSDK 20.0. Please use swf-version 31 or greater and namespace 20.0 or greater to access this feature. For more information about secure socket APIs, refer http://help.adobe.com/en_US/FlashPlatform/reference/actionscript/3/flash/net/SecureSocket.html. No new APIs are introduced in this feature.

APIs not supported for iOS
1. SecureSocket::addBinaryChainBuildingCertificate - Function is not available for iOS. If used, it will throw an exception "Argument Error: Error #2004 One of the parameters is invalid"
2. The APIs related to Querying the properties of X509 certificate are not available in iOS. SecureSocket.serverCertificate property will be returned as "null" on iOS.

AIR 64 bit on Mac OS X

AIR 64 bit provides a major change for the AIR desktop developer. Prior to AIR version 20, AIR only supported a 32 bit Runtime dynamic Library for Mac and Windows. With the release of AIR 20, we will only be providing a 64 bit Runtime dynamic Library on Mac OS X. This means that all new applications created by AIR developers will be running on this 64 bit Runtime on Mac OS X, and all the existing shared, captive, and native applications will continue to work on this 64 bit Runtime on Mac OS X. Please find the relevant changes specific to existing applications:

1. Shared, Captive, and Native: All the apps will continue to run on AIR 64bit.
2. Native Extension: All the native apps using a 32bit ANE will need to add a 64bit ANE to continue to work with AIR 20 and beyond on Mac OS X. To create a 64bit ANE you will need to provide the platform value as "MacOS-x86-64" in the extension.xml file as well as in the command used to create the ANE.

Provide Video Rotation Information to Action Script as Meta Data.

According ISO/IEC 14996-12:2008 standard, videos must provide information matrices like Track Header Box and Movie Header Box. But Flash runtime doesn’t process the matrix field values in Track Header Box and Movie Head Box correctly. This results in incorrect positioning or sizing of videos.

Above problem will be resolved by this specification by providing video matrix information to ActionScript as a part of meta data object of the onMetaData event (Property of NetStream.Client). ActionScript developer then can use these matrices to render the videos as per their wish.

This feature can be used to apply matrix information to a video object. Below is an example:

```javascript
var video:Video = new Video();
addChild(video);
var nc:NetConnection = new NetConnection();
nc.connect(null);
var ns:NetStream = new NetStream(nc);
ns.client = {};
ns.client.onMetaData = ns_onMetaData;
ns.client.onCuePoint = ns_onCuePoint;
video.attachNetStream(ns);
ns.play("Demo.mp4");

function ns_onMetaData(info:Object):void {
```
trace("metaData");
video.x = 0,
video.y = 0;
video.width = info.width;
video.height = info.height;
var matrix:Matrix = video.transform.matrix; // Read old transform matrix of Video object.
var oldSize:Point = new Point(video.width, video.height);
var newSize:Point = new Point(Math.abs(info.matrix.transformPoint(oldSize).x), Math.abs(info.matrix.transformPoint(oldSize).y));
matrix.translate(-(oldSize.x / 2), -(oldSize.y / 2));

if (info.hasOwnProperty("trackHeaderBoxMatrix"))
    matrix.concat(info.trackHeaderBoxMatrix[0]); // Apply the matrix of the Track Header Box of Video Track provided by this feature to video object.
    // trackHeaderBoxMatrix is an array of MatrixObject because there can be one or more video tracks.

if (info.hasOwnProperty("movieHeaderBoxMatrix"))
    matrix.concat(info.movieHeaderBoxMatrix); // Apply the matrix of the Movie Header Box provided by this feature to video object.
matrix.translate((newSize.x / 2), (newSize.y / 2));
video.transform.matrix = matrix; // Set new matrix to transform matrix of Video object.

}

function ns_onCuePoint(item:object):void {
    trace("cuePoint");
}

This feature will be available only for NetStream using Progressive Download. It will not be available for NetStream using RTMP or appendBytes etc. Also, matrix information provided by this feature can only be applied to instance of Video class. It can’t be applied to StageVideo Class.

Matrices' information will only be available for videos which in accordance with ISO/IEC 14996-12:2008 standard.

**PPAPI vector printing**

As of Flash Player version 19, Vector Printing has only been available for NPAPI while PPAPI supported only bitmap printing. Hence there was an observable difference in printing quality between NPAPI and PPAPI (with NPAPI being better). Now in version 20, we have introduced vector printing for PPAPI on Windows, thus giving a better printing experience from PPAPI supported browsers and applications. The bitmap printing will still be supported and the content can request for the same.

"Enable Hardware acceleration" option in context menu settings of Flash Player on Edge/Windows 10 and IE/Windows 8 or above.

The "Enable Hardware acceleration" option is introduced to support the manual switching between software and hardware accelerated operations for the following features:
- Video playback
- Stage3D rendering.
The option is intended to allow users to force a software fallback to resolve display problems caused by faulty GPU drivers.

**Instanced drawing**

Stage3D APIs has provided developers a great way to render graphics efficiently using devices' gpu. Developer can render beautiful graphics using these APIs. But a particular scenario may occur, where a developer wants to render a particular graphical entity, multiple times. Let’s say if a developer wants to create a forest, having thousands of trees. A developer can have few models of trees and from these, he/she wants to create a big forest consisting of thousands of trees. One way to do it is to dispatch as many draw calls as there are trees while changing relevant variables in between. For example, each tree is located in a different spot, each tree can be up to taller or shorter than the average, etc. Doing this using with dispatching separate draw calls can be very inefficient and time consuming.

Instanced drawing feature will come in picture when above mentioned situation arises. By instanced drawing, developer can use a particular model of graphical object and render it more than one time in single frame. This will reduce draw calls and hence rendering and overall performance will be smoother.

For solving instanced drawing problem we have basically introduced two new APIs one additional (iid) register in AGAL. A device should support Standard Extended Profile to have this feature.

1) `Context3D::createVertexBufferForInstances( numElements:int, data32PerElement:int, instancesPerElement:int, bufferUsage:String = "staticDraw", ):VertexBuffer3D;

   The `VertexBuffer3D` object to upload a set of instance data to the rendering context. The vertex buffer contains the data needed to render each instance in the scene geometry. Vertex Buffers with instance data provide attributes that are common to all the vertices of an instance and serve as the input to the vertex shader program.

2) `Context3D::drawTrianglesInstanced( indexBuffer:IndexBuffer3D, numInstances, firstIndex:int=0, numTriangles:int=-1 ):void;

3) AGALv3 is also updated. New AGAL Register: "iid" is added to read the current instance id in the shader. So “mov vt0.x, iid” would be an example AGAL instruction to read instance ID to vt0.x.

AGALv3 is available at: [https://github.com/adobe-flash/graphicscorelib/tree/master/src/com/adobe/utils/v3](https://github.com/adobe-flash/graphicscorelib/tree/master/src/com/adobe/utils/v3)

**Assumptions and Dependencies**
1) This feature will only be supported on devices which supports Standard Extended Profile.

2) Currently this feature is only available in Mobile devices.

**Runtime Versions**

Flash Player: **20.0.0.294**
AIR Runtime: n/a
AIR SDK & Compiler: n/a

**Fixed Issues**

**Flash Player**

Jan19, 2016:
1. LifeChanger C++ Application quits with Access Violation error [4099890]

Jan 12, 2016:
1. Sound issues multiple playback and sound doesn’t stop when playback has ended [4103304]

Jan 8, 2016
1. VB6 Fushing Chart Not Loading [4100436]
2. [ActiveX] Unable to play local swf files using ‘file’ protocol [4101728]

Jan 6, 2016
1. beatingtheblues.co.uk - Flash player freezes [4100386]

Dec. 16, 2015
1. none

Dec. 10, 2015
1. [SAP Only] trackHeaderBoxMatrix and movieHeaderBoxMatrix value are not in proper format. (4093085)

Dec. 7, 2015
1. none

Nov 18, 2015
1. method URLLoader.load fails to load an xml file located within an MHT archive.[4085136]
2. Content gets displayed as black in a Flash site usaflashmap.com [4081533]
3. Flash in 16:9 video resolution shows green strip (noise) on right of video window on Mac [3945461]

Nov 11, 2015
1. [Vector Printing on PPAPI] Some Component (red circles) don’t get printed [4075076]
2. [Vector Printing on PPAPI] Kerning is not handled properly when being printed. [4082635]
3. [Vector Printing on PPAPI] Arabic text is not handled correctly when being printed. [4082661]
Nov 5, 2015

1. Flash content freezes when user inputs multitouch on a 4k multitouch screen on Windows 10 Edge Browser [4054028]
2. The candidate window displayed at wrong position when input some CCJK characters on Windows 10 Edge Browser [4021613]
3. Embedded Flash objects stop working in SMART Notebook [4015165]

AIR

Dec 22, 2015

Mobile:

- [iOS] "This build is invalid" error in iTunesConnect while uploading app
  - This issue has been fixed on Mac. To package the app correctly, so that it gets uploaded to iTunesConnect without any errors
    user needs to perform following:
      - User has to add certificate in the Keychain Access of the Mac and provide necessary permission to it while adt accesses the certificate.
      - If user is doing remote login (ssh) for packaging the app, then it requires extra command. Security unlock <home>/Library/Keychains/login.keychain for successful packaging.

Dec 16, 2015

1. native installer for AIR application gives error in certain scenario [4098155]

Dec 10, 2015

Mobile:

- [Android] Simple option to add "flagNoExtractUi" on Android in Landscape mode for StageText. (3789398)
- [iOS] Bundle errors appearing on uploading app on Appstore (4079233)
- [iOS] Performance problem with the AOT compiler: difference in the execution of the methods with object and interface. (4082885)
- [iOS]: Packaging is failing on Win 8 on targets (ipa-test, ipa-app-store,ipa-debug,ipa-ad-hoc) targets while packaging real world apps with error "Compilation failed while executing: ld64" (4095930)
- [Android] Android TV support is not working.
- ATF texture gets corrupted on MALI GPU platform (4041690, 3961778)

Dec 7, 2015

Desktop:

1. None

Mobile:

1. None

Nov 18, 2015

Desktop:

1. 32 bit AIR applications fail to run if the app is already installed on the machine and runtime is updated to 64 bit [4081178]
2. 32 bit Native applications fail to install when 64 bit AIR Runtime is present [4078413]

Mobile:

1. [iOS] Worker in iOS will cease execution after URLLoader or Loader.load function is called (4067640)
2. [Win][iOS] While publishing a project having more or equal to 14 + ANE's, ipa creation failed with error "input line is too long. Compilation failed while executing: ld64." (4051063)
3. [iOS] StageText: add FocusEvent.MOUSE_FOCUS_CHANGE event that allows preventDefault() to cancel focus loss (4057869)
4. [Android] [User Issue] App crashes while playing .flv videos on Nexus 7 in GPU render mode, working fine in auto and CPU mode.

Nov 11, 2015

1. None
Nov 5, 2015

Desktop:
1. 3578605[Win10] StageWebView not working with native browser option set to true. [4043422]
2. [Mac] HTMLPDFCapability is giving error with new Acrobat Reader DC. [3969723]

Mobile:
1. [Android] Could not to set alternate Android SDK path using -platformsdk option (4002113)
2. [Android] AIR Game Pad is not getting launched on Android M. (4015404)
3. Android build tools need to be updated (3846188)
4. ADT targeting ane will not work for Java7 (3966813)
5. [Window 10] adt is unable to detect ios devices on windows 10 with itunes 12.1 or later showing error iTunes MobileDevice library not found. (4066486)
6. [Win][Itunes] : adt is not detecting iTunes 12.3 (4059341)

**Known Issues**

**Flash Player**

Jan 19, 2016:
- None

Jan 12, 2016:
- None

Jan 6, 2016:
1. VB6 Fushing Chart Not Loading [4100436]
2. [ActiveX] Unable to play local swf files using 'file' protocol [4101728]
3. Sound issues multiple playback and sound doesn’t stop when playback has ended [4103304]

Dec 16, 2015
1. beatingtheblues.co.uk - Flash player freezes [4100386]

Dec 10, 2015
1. none

Dec 7, 2015
1. none

Nov 11, 2015
1. None

Nov 5, 2015
1. Content gets displayed as black in a Flash site usaflashmap.com [4081533]

**AIR**

Dec 22, 2015

Mobile:
- [OS][Win] IPA packaged on Windows machine cannot be submitted to the Apple App store. Error "This build is invalid" occurs in iTunes connect.

Dec 16, 2015

Mobile:
- [iOS] "This build is invalid" error in iTunesConnect while uploading app. (4099804)
- [Android] Android TV support is not working.
Dec. 10, 2015

Mobile:

- [iOS 7] There are several issues related to Screen Orientation on iOS7. There is simple workaround for this Use platform sdk switch pointed to iOS9 sdk.

<sdk Path>/adt -package -target <target> -provisioning-profile <provisioning profile> -storetype pkcs12 -keystore <certificate> -storepass <password> -name of ipa -xml -swf -platformsdk <platform sdk home>

Dec 7, 2015

Desktop:

1. none

Mobile:

1. [iOS] Bundle errors appearing on uploading app on Appstore (4079233)
   Workaround: User needs to add following tag under InfoAdditions to allow the submission of application in Apple App store.
   <key>UIRequiresFullScreen</key> <true/>

2. [Android] Android TV support is not working.

Nov 18, 2015

1. None

Nov 11, 2015

1. None

Nov 5, 2015

Desktop:

1. [Mac AIR 64bit] DRM: AIR Shared Runtime app is failing or crashing on mac [4084212]

Mobile:

1. [Android 6] Stage3D AIR application fails to return from background (4083403)
2. [iOS] Worker in iOS will cease execution after URLLoader or Loader.load function is called (4067640)
3. [iOS] StageText: add FocusEvent.MOUSE_FOCUS_CHANGE event that allows preventDefault() to cancel focus loss (4057869)
4. [iOS] Crash if Class used in Main and Background worker is a CustomClass (4068748)
5. [Win][iOS] While publishing a project having more than or equal to 14 + ANE's, ipa creation failed with error "input line is too long.
   Compilation failed while executing: ld64." (4051063)
6. ASC2.0 compiled app report Type Coercion crashes with MovieClips in SWC. (3592482)

Authoring

Authoring for Flash Player 20

To use the new Flash Player, you will need to target SWF version 30 by passing in an extra compiler argument to the ASC 2.0 compiler:
-swf-version=30. Directions are below:

- Download the new playerglobal.swc for Flash Player 20
- Download and install Flash Builder 4.7 from Creative Cloud: https://www.adobe.com/products/gaming/tools.html
- Backup the existing AIR SDK if you need to restore it later then replace the bundled AIR SDK with the AIR 20 SDK. To do this, unzip the AIR 20 SDK to this location:\n  MacOS: /Applications/Adobe Flash Builder 4.7/eclipse/plugins/com.adobe.flash.compiler_4.7.0.348297/AIRSDK
  Windows: C:\Program Files\Adobe\Adobe Flash Builder 4.7 (64 Bit)\eclipse\plugins\com.adobe.flash.compiler_4.7.0.349722\AIRSDK\n- In Flash Builder, create a new project: File -> New -> project.
- Open the project Properties panel (right-click and chose 'Properties'). Select: ActionScriptCompiler from the list on the left.
- Add to the 'Additional compiler arguments' input: -swf-version=30. This ensures the outputted SWF targets SWF version 30. If you compile on the command-line and not in Flash Builder, you need to add the same compiler argument.
Authoring for AIR 20 Update to the AIR 20 namespace

You must update your application descriptor file to the 20 namespace in order to access the new AIR 20 API's and behavior. If your application does not require the new AIR 16 API's and behavior, you are not required to update the namespace. However, we recommend all users start using the AIR 20 namespace even if you are not yet taking advantage of the new 16 capabilities. To update the namespace, change the xmlns attribute in your application descriptor to: `<application xmlns="http://ns.adobe.com/air/application/ 20.0">`

System Requirements

For current release of Flash Player in production, system requirements visit - http://www.adobe.com/products/flashplayer/systemreqs/
For current release of AIR in production, system requirements, visit - http://www.adobe.com/products/air/systemreqs/

Flash Player 20 has the following minimum system requirements:

<table>
<thead>
<tr>
<th>Windows</th>
<th>Macintosh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td></td>
</tr>
<tr>
<td>2.33 Ghz or faster x86-compatible processor, or Intel® Atom™ 1.6GHz or faster processor for netbook class devices</td>
<td>Intel® Core™ Duo 1.83GHz or faster processor</td>
</tr>
<tr>
<td>Operating System</td>
<td></td>
</tr>
<tr>
<td>32- and 64-bit (unless noted): Microsoft® Windows® XP (32-bit), Windows Vista® (32-bit), Windows 7, Windows 8.x and Windows 10</td>
<td>Mac OS® X v10.6 or higher</td>
</tr>
<tr>
<td>Browser</td>
<td></td>
</tr>
<tr>
<td>Internet Explorer 8.0 or later, latest versions of Microsoft Edge, Mozilla Firefox, Google Chrome and Opera</td>
<td>Latest versions of Safari, Mozilla Firefox, Google Chrome, and Opera</td>
</tr>
<tr>
<td>Memory</td>
<td></td>
</tr>
<tr>
<td>512MB of RAM (1GB RAM recommended for netbook class devices), 512MB of graphics memory</td>
<td>256MB of RAM, 512MB of graphics memory</td>
</tr>
</tbody>
</table>

AIR 20 has the following minimum system requirements:

<table>
<thead>
<tr>
<th>Windows</th>
<th>Macintosh</th>
<th>Android</th>
<th>iOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor / Device Hardware</td>
<td></td>
<td>ARMv7 processor with Vector FPU, Minimum 550MHz, OpenGL ES 2.0, H.264 &amp; AAC H/W Decoders</td>
<td>iPod touch 5 and above, iPhone 4 and above, iPad 2 and above</td>
</tr>
<tr>
<td>Operating System</td>
<td></td>
<td>Mac OS® X v10.7 and above</td>
<td>iOS 7.x and above</td>
</tr>
<tr>
<td>RAM</td>
<td>512MB of RAM (1GB recommended)</td>
<td>Android 4.0 and above</td>
<td></td>
</tr>
<tr>
<td>AIR SDK</td>
<td>AIR SDK Development Supports Microsoft® Windows 7 and above, 64-bit only</td>
<td>AIR SDK Development Supports Mac OS 10.9 and above, 64-bit only</td>
<td></td>
</tr>
</tbody>
</table>