ADAnews

New Features of Adobe Acrobat 2.1 and its SDKs

The Adobe®Acrobat® product line offers a rich variety of application programming interfaces (APIs), accessible through interapplication communication (IAC) and through an extensive set of exported methods for building plug-ins. Developers can control Acrobat products through Apple® events or OLE automation. Through the plug-in API, plug-ins can enhance the Acrobat viewer's user interface and manipulate Adobe Portable Document Format (PDF) files.

Taking advantage of this flexibility, version 2.1 enhances the Acrobat product line in several ways: support for more platforms, an expanded API, and new plug-ins to add multimedia and World Wide Web access capabilities. PDF has been extended to support these new features. Acrobat has two software development kits (SDKs) to aid developers in expanding the viewers' capabilities: the Acrobat SDK for developing applications that use IAC, and the Acrobat Plug-ins SDK for extending Acrobat using its exported methods as well as IAC. Both SDKs have recently been supplemented and reorganized to be easier to use, boosting software developers' productivity.

This article explores new features of Acrobat 2.1 that affect developers, additional APIs for Acrobat 2.1, the new Weblink plug-in, and enhancements to the Acrobat SDKs.

What's New in Acrobat 2.1

You can now develop applications and plug-ins for several new platforms, as the following table of current version numbers shows.

Current versions of Acrobat Products

	Macintosh®	Windows®	HP-UX	SunOS™	Solaris®
Acrobat Reader	2.1	2.1	2.1	2.1	2.1
Acrobat Exchange™	2.1	2.1	2.1	2.1	2.1
Acrobat Distiller®	2.1	2.1	—	2.1	2.1

The new version of the full function Acrobat viewer, Acrobat Exchange 2.1, now runs under Microsoft® Windows NT™ 3.5 (or later), Windows 3.1, and Windows 95, as well as OS/2 2.1 (or later) in Windows compatibility mode. Acrobat Exchange remains a 16-bit application. For the Apple Macintosh, Acrobat Exchange 2.1 includes native Power Macintosh® and 680X0 versions. Although the Power Macintosh native version of the viewer can use only Power Macintosh plug-ins and the 680X0 viewer uses only 680X0 plug-ins, you can build "fat" plug-ins that run with either viewer.

Adobe

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The Acrobat product line for the UNIX® platform has been expanded and updated. Exchange 2.1 for the UNIX platform now accepts plug-ins and supports the full Acrobat Exchange 2.0 API as well as new UNIX-specific methods. The Acrobat Reader, which only allows viewing and printing PDF files, is also available for the IRIX system.

Adobe Type Manager® (ATM®), which renders Type 1 fonts, has been built into Acrobat Exchange and Reader 2.1 for Windows, so it is no longer necessary to install ATM on Windows systems to run Acrobat products.

Acrobat 2.1 offers two new plug-ins: Weblink and Movie. Weblink enables users to create links to other PDF and HTML documents on the World Wide Web. Movie allows users to add QuickTime® and AVI (Windows only) movies and sounds to PDF files.

All Acrobat 2.1 Readers are free and can now use specially enabled plug-ins, such as Acrobat Search, Weblink, and Movie. This allows Acrobat Reader users to take advantage of new capabilities in PDF files created with Acrobat Exchange, such as links to documents on the Web. The Acrobat Reader for Macintosh is available in both Power Macintosh native and 680X0 versions.

The 2.1 version of the Acrobat Distiller application, the program that produces PDF files from PostScript® language files, provides automatic filter selection (JPEG or LZW) on an image by image basis. This enables documents with a mixture of photographic images and screen shot images to be processed with optimum results: photographic images are compressed with JPEG while screen shots are compressed with LZW. The **pdfmark** operator, which allows you to specify PDF constructs (such as bookmarks) in a PostScript language file, now permits placing arbitrary actions and data into annotations. This is useful if you have created a custom annotation or action and want the Acrobat Distiller program to generate PDF files containing the new annotation or action. For instance, a driver can place **pdfmark** calls that specify URI actions into a PostScript language file; the Acrobat Distiller application then automatically generates PDF files with URL links that the Weblink plug-in can use.

Other Changes in Acrobat 2.1

Acrobat Exchange LE (Limited Edition) has not been upgraded to version 2.1, and no future versions will be produced. Users of Acrobat Exchange LE, in general, should switch to Acrobat Exchange, which integrators can purchase at a discount in volume. Using the Acrobat Reader may be sufficient for many users since it now supports some plug-ins such as Search.

The Acrobat Toolkit (formerly known as the Text Extraction Toolkit) exports a subset of the Acrobat Exchange plug-in API methods. Using these methods, you can extract text from PDF files or retrieve values from a document's Info dictionary. Thus, you can develop a variety of text processing applications for PDF files with this Toolkit. This toolkit is available for Windows NT/Windows 95 (Win32), IRIX, AIX®, HP-UX, SunOS, and Solaris systems. The Acrobat Toolkit is no longer free; contact the Adobe Developers Association for licensing information.

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Acrobat Plug-In API Changes

Acrobat Exchange 2.1 for Macintosh and Windows adds several methods to the areas of its exported API that manage the Acrobat viewer and manipulate PDF documents. With these methods, you can do the following:

- Broadcast a notification that informs the Acrobat viewer that a page's contents has been modified and tells the viewer whether or not to redraw the page immediately. Plug-ins that make several modifications to a page's contents and want to redraw the screen only once can call this function to avoid the screen "flash" and overhead of redrawing the page several times. The notification sent by this method is also new.

- Clear flags associated with a document. A frequent use of this method is to clear the flag that indicates a document needs to be saved; this marks a modified document as clean and avoids displaying the Save dialog box when the file is closed. For example, a read-only document database might allow a user to make document annotations that would be saved in a separate file—but prevent the user from saving these changes to the document itself. Other document flags hold information such as modification status, version status, and whether the document was repaired on opening.

- Get text from a selection, convert it to a specified format, and pass it to a specified function for further processing. Text may be converted to plain text, Rich Text Format (RTF), or both. This method provides great flexibility in processing text since the specified function is user-defined. The method provides an easy way to get a plain text or RTF representation of selected text in a PDF file; this text could then be further processed to create a search index, to create a custom annotation, to enhance the text in some way, and so on.

- Get or set the OLE client (container application) name for a specified viewer document. A plug-in can use this method to determine which client application caused the viewer to open the document. This function can be used by plug-ins that open PDF documents in the viewer via DDE or Apple events.

To use a new API method or the new notification, you have to change a plug-in version number in a header file and, for the Macintosh, precompile the headers and add the updated precompiled header file to your project. If you make these changes, you can't run the newly built plug-in with the Acrobat 2.0 or earlier viewers. For this reason, if you don't need these new methods, continue to use the older version number so that your plug-ins can be used with both version 2.0 and 2.1 viewers.

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UNIX 2.1 Acrobat Exchange provides 21 new UNIX-specific methods to handle events, synchronize a plug-in with the platform's window manager, get environment information, read resources, and read or write the preferences file. For example, you can obtain the name of the current working directory, home directory, and the directory in which the Acrobat viewer is installed. You can get resources such as bitmaps and pixmaps for internationalized icons or cursors. Some wrapper methods are also available for UNIX functions such as `XtDispatchEvent( )`.

For more information on the API additions mentioned in this article, see technical note #5168, "Acrobat Viewer Plug-In API On-line Reference", in the Acrobat Plug-ins SDK.

Weblink Plug-in

The Weblink plug-in can embed a Universal Resource Locator (URL) in a PDF file, enabling users to connect a PDF file to any other supported file type on the World Wide Web. To the user, these links to URLs appear to work like other PDF document links: when the user clicks on a Weblink, the Web browser window comes to the front, displaying the file specified by the URL. Weblink is supported by Netscape Navigator™ 1.1 and Spyglass Enhanced Mosaic™ 2.X.

Weblinks are represented in PDF as URI actions, as specified in technical note #5156, "Updates to the Portable Document Format Reference Manual" (September 1995 version). A Weblink's action entry has the subtype URI and contains the URL. The entry may include an `IsMap` attribute, which indicates whether or not the mouse position is appended to the end of the URL, as in the following:

```
http://www.adobe.com/intro?100,200
```

This feature directly parallels the HTML `IsMap` directive for images. It's useful when you want the link's destination to depend on where the user clicks in the link, such as when the link image is a map of some kind.

Weblink exports functions other plug-ins can use to perform such activities as opening URLs through a browser and updating a progress monitor. Further information on Weblink's exported functions can be found in technical note #5160, "Acrobat Weblink Plug-In HFT Specification", available in the Acrobat Plug-ins SDK.

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Weblink includes a standard driver that handles all communication with the Web browser. Separate drivers are provided for the Netscape and Spyglass browsers; the user can specify which driver is used. These drivers are implemented as plug-ins and are independent of how URLs are represented in the PDF file.

New SDK Features

The Acrobat and Acrobat Plug-ins SDKs have been reorganized for easier use. The *WELCOME.PDF* file navigates you through logical groupings of documents.

Both the Plug-ins API and interapplication communication technical notes have been split into overview and on-line reference documents. For instance, technical note #5168, "Acrobat Viewer Plug-in API On-line Reference", lists methods, declarations, notifications, errors, macros, and objects—all easily accessible by bookmarks and cross-references. An extensive web of links in these on-line references gives quick access to related methods, declarations, and error messages for each entry.

Technical note #5169 "Acrobat Viewer Plug-In API Tutorial", makes it easier to learn how to write plug-ins. Technical note #5167, "Acrobat Viewer Plug-In Development", lists development guidelines for plug-ins on Power Macintosh and 680X0 Macintosh, Windows, and UNIX platforms. This note also provides techniques to simplify porting plug-ins among platforms. Although the plug-in API is largely platform-independent, cross-platform developers can reduce their effort by observing these guidelines.

Finally, the SDK contains more samples to get you started with your applications and plug-ins. DDEOpen is a simple DDE example that demonstrates how to open a PDF file through DDE. PDFWCTRL is a new Windows application that demonstrates how to communicate with PDFWriter. The new sample Acro21 shows how to build an Acrobat 2.1 plug-in and how to use the new version 2.1 exported methods. The SetSec plug-in manipulates read and write security settings of a document using the API and allows batch setting of security on PDF files, which is useful if you need to set security for a large number of files. Several existing plug-ins have been enhanced to communicate with a debugger window provided by another plug-in to show the order of operations.

Every Macintosh SDK sample has a project that creates a "fat" plug-in that works with either a 680X0 Acrobat 2.0 or 2.1 viewer or an Acrobat 2.1 viewer for the Power Macintosh.

Adobe PostScript

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Summary
The new Acrobat 2.1 product line and its SDKs aid Acrobat development in these ways:

- Acrobat products now support a wide variety of platforms, including Power Macintosh and Windows 95.

- New methods have been added to the plug-in API, both general purpose and UNIX-specific.

- The Weblink plug-in, which comes with Acrobat Exchange and Reader, may link users to any file on the World Wide Web. Weblink's capabilities are exported through a set of APIs that applications and plug-ins can use.

- The SDKs are easier to use: it's simpler to navigate through documentation, a tutorial helps you learn how to write plug-ins, and on-line references bring detailed information to you faster.

Contact the Adobe Developers Association for more information on the Acrobat SDK or the Acrobat Plug-ins SDK. §

PostScript Language
Technologies

Adobe Brilliant Screens

Adobe Brilliant™ Screens (ABS) is a new screening technology, introduced by Adobe in March of 1994. This month's PostScript language technologies column will compare Adobe Brilliant Screens to conventional screening, and will instruct application and driver developers on how to support ABS in their products.

Background: Conventional Screening

With conventional screening methods, gray tones are represented by building a halftone dot using device pixels within a halftone cell. To obtain darker grays, more pixels are turned on to increase the dot size. The halftone cells make up a rectangular grid. To avoid moiré patterns when printing multiple colors, extreme care must be taken to generate different screens with precise grid angles and frequencies for each printing color. Often these angles and frequencies are sensitive to variations in press registration.

A Different Approach: FM Screening

FM Screening stands for frequency modulated screening. Conventional screening might be characterized as "AM" or "amplitude modulated" screening. FM screening uses smaller dots that are not restricted to a fixed grid pattern, as shown in figure 1. By varying the number of dots in any given area, any desired gray level can be generated.

Conventional Screens Halftone Cell
Conventional screening varies size of potentially large halftone dot.
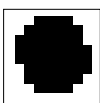
FM Screens Halftone Cell
FM screening varies distribution of a number of small dots.
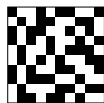

Figure 1 Halftone Cell Comparison of Conventional and FM Screening

Since FM screening dots are significantly smaller than conventional halftone cells, more detail can be represented. In addition, FM screening methods employ randomness or "noise generation" in determining where to place pixels. This produces smoother tone transitions and eliminates patterns that could lead to a moiré effect. FM screens tend to be less sensitive to registration variations on the press. Figure 2 shows sample screens using conventional and FM screening methods.
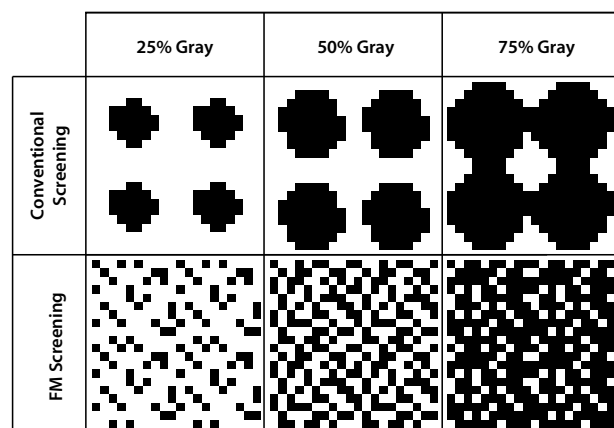

Figure 2 Sample Screens using convenional and FM Screening Methods

ABS

ABS is Adobe's FM screening solution. ABS, which relies on Level 2 threshold arrays, is available on many PostScript Level 2 output devices from participating Adobe OEMs.

When present on desktop printers, ABS is typically installed as the default halftoning method. No end-user activation is needed. On such devices, Adobe Brilliant Screens allows the representation of all 256 gray levels, improving output quality by eliminating the banding and posterization artifacts that may result when conventional screening is used.

Other types of devices, such as imagesetters, may have several ABS screen sets installed, with each screen tuned for a specific press configuration. PPD files for such devices should contain an OpenUI/CloseUI entry to allow selection of a particular screen set.

PostScript Technologies Column

How Users Select ABS

On many devices, ABS will be the default screening method. In that case, when users print using the printer's default screens, they will get ABS. This will most likely be the case on color desktop printers.

In cases where ABS is not the default, ABS is made available to end users through selection of a particular screen frequency, called the *key frequency*. In order to use ABS, users need to know what key frequency to enter. The printer manufacturer will provide documentation to the user that specifies the key frequencies to use with their output devices. If the user requests a screen frequency that is not one of the unique key frequencies identified by the printer manufacturer for ABS, then conventional screening will be used. For example, if the key frequency for a device is "35", and the user requests a screen frequency of 35, then the printer will ignore the requested angle and spot functions and use ABS. If the user requests a screen frequency value other than 35, however, conventional screens will be used, even if ABS is the default for that output device.

If a device has a choice of more than one set of ABS screens, the printer manufacturer should provide a key frequency table that will indicate the compensated screens and the press conditions for which each set is appropriate. When the user requests a particular screen frequency, a screen filter on the printer will use that frequency value as the "key" to determine which ABS halftone dictionary to use.

Note: Key frequency values can and will vary among printer manufacturers, and among output devices from the same manufacturers.

Supporting ABS in your Application or Driver

If you develop either a PostScript printer driver or an application, you may assist your users in using ABS for their output by following these guidelines:

1. Allow your users to choose the printer's default screens. On desktop printers, where ABS is likely to be the default, you should not send any calls to **setscreen** or **sethalftone**.

These calls may override the default FM screening, and give your users conventional screening, which is usually less desirable.

2. Allow your users to specify a screen frequency for individual print jobs, and for individual graphic objects on a page. Your application should accept values in the 15 to 300 range, to be consistent with other desktop publishing products on the market. This will allow users to type in the key frequency values provided by their printer manufacturers, to achieve ABS screening on specific objects or print jobs.

3. If you parse PPD files, display `OpenUI/CloseUI` entries for your users, so they may choose different screen sets provided in some PPDs.

4. Allow users to override application heuristics. Some applications modify screen frequency requests entered by users, if they determine that the value entered will yield poor results. Such practice may interfere with the user's ability to request ABS.

5. Do not put device-dependent code requesting screen values in device-independent files, such as EPS files. Specifically, do not include code to set the halftone screen, which may cause unexpected results should the file be redirected to another output device. Rather, the EPS file should leave the default screen undisturbed, and rely on applications or utilities later in the prepress pipeline to request screening methods.

FM screening technology, which includes Adobe Brilliant Screens, offers benefits to users printing images and tints for a wide variety of applications. By following the above guidelines, your application can make sure your users see the benefits of this new technology. §