

PDF/X Three Flavors... from which to choose

by David McDowell, NPES/Eastman Kodak

What Is PDF/X?

Although anyone who attended the recent IPA Technical Seminar was inundated with PDF/X (Portable Document Format/eXchange) in all of its flavors, there are many in the industry (and in IPA) who do not understand PDF/X and its relationship to PDF. Let's take a quick overview of the PDF/X family of standards.

PDF/X Is...

- A focused subset of the Adobe PDF file format specification,
- Intended for reliable graphic arts data exchange, and

•Defined in ISO (International Organization for Standardization) standards.

The first question most people have is: "Why do we need more file formats? Aren't the formats out there already good enough?"

The answer is both "yes" and "no." The most reliable file exchange format for graphic arts applications

has been TIFF/IT (Tag Image File Format/Image Technology) formally known as *ISO 12639:1998, Graphic technology—Prepress digital data exchange—tag image file format for image technology.*

PDF/X-1a will be preferred for the publication markets. Initially, users of PDF/X-3 will be found in the newspaper area and individualized printing using digital presses. Catalogue and commercial printing will benefit from PDF/X-2. However, as we gain experience, the use of the various flavors of PDF/X is going to become mixed and job dependent. Ideally they will be like flavors of ice cream—mix and match as taste dictates.

It has and will continue to serve the industry well, but it is restricted to raster data. An additional standard format is required that will support object based file types in addition to raster data.

As we look at this class of file formats, we really have too many to choose from—most of them unique to specific application programs. PDF is more general, but has so

many options that it is very difficult to be sure that the sender and receiver of a file have the same understanding of the options chosen and how to handle them. PDF by itself does not provide the level of reliability required for the graphic arts industry—particularly for catalogue and advertising material.

This is where the "X" in PDF/X comes in. Although never formally defined, the "X" to most folks involved in standards activity represents reliable eXchange. This could be accomplished by identifying a limited set of PDF objects

that may be used and adding restrictions to the use, or form of use, of those objects, and/or keys within those objects. The goal is that as long as both the sender and receiver of a file use applications that meet the same PDF/X restrictions then the received file when printed will be exactly what the sender intended—no surprises and no detailed conversations to iron out the details!

The term “blind exchange” conveys some of the intent behind the development work. The belief is that, particularly for the placement of advertising, the prepress shop that created the final ad file should be able to send the same file to anyone the agency has contracted with to print the ad. PDF/X should be an electronic substitute for the distribution of film separations that worked so well for so long.

One other caution, many people confuse the Adobe products such as Acrobat and Distiller, which use the PDF file format, with the PDF file format specification itself. They are two different things. Both Acrobat and Distiller are based on the PDF file format specification and read or create many different types of PDF files whose features depend on the particular settings used. However, as yet there is not a check box in either product that says PDF/X.

So Why Multiple Flavours?

All graphic arts electronic data exchange is a compromise between three issues - reliability, flexibility, and application complexity (and cost). If we had only a single format specification for the most reliable simplest exchange, it would not meet many real workflow needs. Conversely, a very flexible all-in-one approach would put a burden on many application areas that do not want to pay for features that they will not use. A good example of this is the support for OPI (Open Prepress Interface). Some markets absolutely insist that it is a required feature, others say that requiring the inclusion of the OPI capability will make the receiving applications too costly for widespread use.

The nub of the problem is this: If PDF/X is to be successful, every receiving software application must be able to read and appropriately process all conforming PDF/X files as defined for that compliance level.



There are currently three different international standards in preparation. These are *ISO 15930, Graphic technology—Prepress digital data exchange — Use of PDF*

—Part 1: Complete exchange using CMYK data (PDF/X-1 and PDF/X-1a),

—Part 2: Partial exchange (PDF/X-2), and

—Part 3: Blind exchange suitable for color managed workflows (PDF/X-3).

The PDF/X-1 Flavour

Part 1 is largely intended to meet the needs of the U.S. publication marketplace, based on the requirements developed by and through the DDAP Association. Of course it will also meet many other needs. To quote directly from its introduction:

Part 1 of this International Standard defines a data format and its usage to permit the predictable dissemination of a compound entity to one or more locations as CMYK data, in a form ready for final print reproduction, by transfer of a single file. This file must contain all the content information necessary to process and render the document, as

intended by the sender. This exchange requires no prior knowledge of the sending and receiving environments and is sometimes referred to as “blind” exchange. It is platform and transport independent.

These goals are accomplished by defining a specific use of the publicly available Adobe Portable Document Format as specified in Version 1.3

In order to achieve a level of exchange that avoids any ambiguity in interpretation of the file, it identifies a limited set of PDF objects which may be used and adds restrictions to the use, or form of use, of those objects, and/or keys within those objects. It includes two compliance levels, PDF/X-1 and PDF/X-1a, that differ only in their allowed use of OPI references and encryption, which are allowed in PDF/X-1 but not in PDF/X-1a.

The only “standards” term that has crept in the above quote is “compound entity.” It is defined as a “unit of work with all text, graphics and image elements prepared for final print reproduction and may represent a single page for printing, a portion of a page or a combination of pages.”

PDF/X-1a is essentially a simplified version of PDF/X-1 and, therefore, a PDF/X-1 receiving application will be able to easily receive both PDF/X-1 and -1a files. For smaller and/or simpler installations PDF/X-1a may suffice. In all, cases the writing applications only need to support those features in the standard that the user requires.

Because this ISO version is based on PDF 1.3, DeviceN color space is supported and therefore duotones, bump plates, etc., are enabled. See the next section concerning the CGATS (Committee for Graphic Arts Technologies Standards) version.

PDF/X-1, as defined by ISO 15930-1:2001, has been approved and is being prepared for publication by the ISO Central Office. It should be available by mid to late August.

What About the CGATS Version?

I am sure some of the more standards savvy readers are saying, “What happened to the ANSI version called CGATS.12/1?”

Or as it is more properly called *CGATS.12/1-1999, Graphic technology—Prepress digital data exchange—Use of PDF for composite data—Part 1: Complete exchange (PDF/X-1)*.

Yes, it is still a valid standard based on Version 1.2 of the Adobe PDF file format specification. However, as we were preparing the ISO version (which is based on CGATS.12), there was great pressure to both make it compatible with Version 1.3 of the PDF file format specification and to allow a compliance level that did not require support for OPI.

To minimize confusion, users and vendors are being asked to refer to the CGATS version as PDF/X-1:1999, and the ISO versions as PDF/X-1:2001 and PDF/X-1a:2001.

Base PDF/X

There is another standard in development that should be mentioned. It is *ISO 15929, Graphic technology—Prepress digital data exchange—Guidelines and principles for use of PDF*. It is a standard for standards writers and is sometimes called “Base PDF/X”.

It specifies the guidelines and principles for the use of the Adobe Portable Document Format (PDF) in graphic technology applications and it becomes the basis for the development of all PDF/X standards.

While all members of the PDF/X family of International Standards will be documented as parts of ISO 15930, national bodies are also encouraged to base any standards that define the use of the PDF file format for graphic technology applications on this International Standard.

As part of this standard CGATS (and its secretariat, NPES The Association for Suppliers of Printing, Publishing and Converting Technologies, 1899 Preston White Drive, Reston, Virginia 20191-4367) has agreed to make the use of the GTS_ PDFX name prefix (used to identify various compliance levels) available without prejudice to accredited standards groups within the worldwide graphic technology industry and to maintain an open registry of all such uses.

Base PDF/X has been approved and is currently being prepared for publication by ISO. We anticipate that it will be available in early fall.

While a PDF/X-1:2001 reader will probably be designed to accept and properly read files conforming to PDF/X-1:2001, PDF/X-1:1999 and PDF/X-1a:2001, readers meeting the other two conformance levels should not be expected to properly read files outside of their own conformance level.

I am sure many are saying, “Why can’t the standards committees keep more current with the Adobe PDF file format specification releases?”

Therein lies a problem. Because the Adobe PDF file format specification is a private specification (albeit documented and publically available), Adobe has chosen not to make the various versions of the specification publically available until Adobe products implementing the specification are available in the marketplace.

Although many developers (even those participating in the standards process) have signed non-disclosure agreements and have advance insights, the whole concept of non-disclosure runs counter to the open standards process. As long as companies maintain such policies, the standards will be one step behind. For example, although Acrobat 5 is based on Version 1.4 of the Adobe PDF file format and is currently being sold, an Adobe Technical Note describing the changes between Version 1.3 and Version 1.4 was only recently made available. To wait for final documentation and incorporate Version 1.4 would have delayed the standards approval process significantly.

Let’s Jump to the PDF/X-3 Flavor or PDF/X-3 has many things in common with PDF/X-1a. They are really sisters. The one big area in

International Color Consortium

ICC is the abbreviation for the International Color Consortium. The ICC is the industry group developing the technology and profile format specifications for color management. The XXX issue of *The Prepress Bulletin* contains an article that describes the work of the ICC in detail.

which they differ is that PDF/X-3 allows the use of color managed three-component data in addition to CMYK data.

What does “color managed” data mean? One of the ways in which the PDF/X family differs from plain old PDF is that all data in a set of files being exchanged must be color corrected and adjusted for a single characterized printing condition prior to exchange. That means that all process color data must be based on the same inks, densities and dot gain.

In PDF/X-1, allowing only CMYK data was one step taken to make this more predictable. In addition an ICC input profile (device to PCS transform) had to be included, or referenced, to define the particular type of CMYK printing (for example, SWOP (Specifications for Web Offset Publications), SNAP (Specifications for Non-Heatset Advertising Printing), etc.).

With PDF/X-3, the Standards Committee got braver and agreed to allow the inclusion of an ICC output profile (PCS-to-device and device-to-PCS transforms) to define the relationship between three-component advertising data and the data to be used to for final rendering. While this is typically CMYK data for printing and publishing applications, this mechanism allows any output color space to be used—for example, web RGB, some special RGB or CMY printing device, photographic output, etc.

The requirement still exists that all data has to be prepared for the same “printing” condition so that all data in the files being exchanged will work together.

The recent *Adobe Technical Note #5413 (Recording Output Intentions for Color Critical Workflows)* describes the use of the Output Intents array in the Catalog object as the way that this information is carried in a PDF file.

ISO 15930-3 (PDF/X-3) has passed its first ISO ballot (Committee Draft or CD) and is being prepared for balloting as a Draft International Standard (DIS). That requires a five-month voting period, so it is hoped that PDF/X-3 can be

approved by the end of the year and published early in 2002.

The PDF/X-2 Flavor

PDF/X-2 is both the most difficult and potentially the most useful of the current PDF/X family. It is based on PDF/X-1a and PDF/X-3 and will be compatible with both. Both CMYK data as well as properly characterized three-component advertising data are supported. However, as its title says, it also adds something called “partial exchange.”

That word “partial” can be misleading. What it really means is that in certain workflows some or all of the referenced elements may be more logically present at the receiving site, or may be exchanged at a different time. These include fonts, high resolution contone image files, or line art files. What makes this difficult is that the scope currently includes the statement “where all elements necessary for final print reproduction are either included or uniquely identified”. It is that “uniquely identified” that has been causing problems.

PDF/X and Related Issues

There are a number of useful Web sites available that provide additional information about PDF/X and related issues.

CGATS and TC130 information can be found on the NPES Web site, at www.npes.org/standards/workroom.html.

The DDAP site, www.ddap.org, is also a good general source for information about TIFF/IT and PDF/X. It also lists vendors supporting these standards and DDAP tools for evaluation and preflighting.

An excellent FAQ on PDF/X, by Martin Bailey of Harlequin/Global Graphics, can also be found on the DDAP Web site: www.ddap.org/resources/pdf-x_faqs.html. (Martin is the chair of both the CGATS and ISO subcommittees working on PDF/X).

Information about the ICC can be found at www.color.org.

The committee believes that unique identification is a real requirement for reliable data exchange. Finding the best compromise between the three issues of reliability, flexibility, and application complexity is the issue. Because a PDF/X-2 exchange is defined to require communication between sender and receiver (not a blind exchange) some additional flexibility is available—but not much.

A good, and the most difficult, example is fonts. While PDF/X-1 and PDF/X-3 require that all fonts used are embedded, there are some fonts whose license does not permit embedding (or for some Asian fonts they are too large to embed practically). PDF/X-2 would not require embedding, just unique identification. However, how does one ensure that the sender and receiver have exactly the same version of a font, including any edits that might have been made to font metrics?

Most of the tools to accomplish such checking are based on proprietary technology and require licenses or fees for use. To require use of such proprietary technology in a standard is a last resort.

One of the possibilities being investigated provides a field in which any font checking application can be identified and the verification data for all fonts used carried. It would then be the responsibility of the sender and receiver(s) to agree on the use of a particular application that they felt was a reasonable compromise between reliability, flexibility, and application complexity.

The choice of a particular application might even be made by a trade group for a particular class of work—for example, the NAA (Newspaper Association of America) for newspapers, etc.)

PDF/X-2 is being developed jointly by CGATS and the ISO/TC130. Subcommittee 6 Task Force 1 of CGATS is taking the lead and developing the details that are being reviewed by a Task Force in TC130. As soon as a satisfactory draft is available it will be placed in ISO ballot.

The CGATS Committee is meeting the third week of August and it is hoped that the draft from that meeting will be ready for ballot. Realistically, the earliest that PDF/X-2 could become a published standard is mid-year 2002.

Which Flavor to Choose?

The choices available to users will, in part, depend on the vendors and the applications they choose to develop. The design and prepress side of the printing and publishing industry has been notorious for trying to use off-the-shelf office products and not being willing to support (or insist on) special software that provides the level of reliability really needed by the graphic arts industry.

With this new suite of standards the opportunity exists for a variety of applications based on standard exchange formats to meet virtually every publication and commercial printing workflow need in our industry. However, user commitment and vendor implementation is required to make it happen. Our old friend TIFF/IT will also continue to be useful in many situations where raster data is the preferred format.

PDF/X-1a will probably be the preferred choice for most of the publication markets. Initially, the principal users of PDF/X-3 will probably be found in the newspaper area and possibly for individualized printing using digital presses. The catalogue and commercial printing areas will benefit most from PDF/X-2. However, as we all gain experience and confidence (and as application programs develop), the use of the various flavors of PDF/X is probably going to become very mixed and job dependent. Ideally they will be like flavors of ice cream—mix and match as taste (or need) dictates. **IPA**