# An Overview of PDF/X

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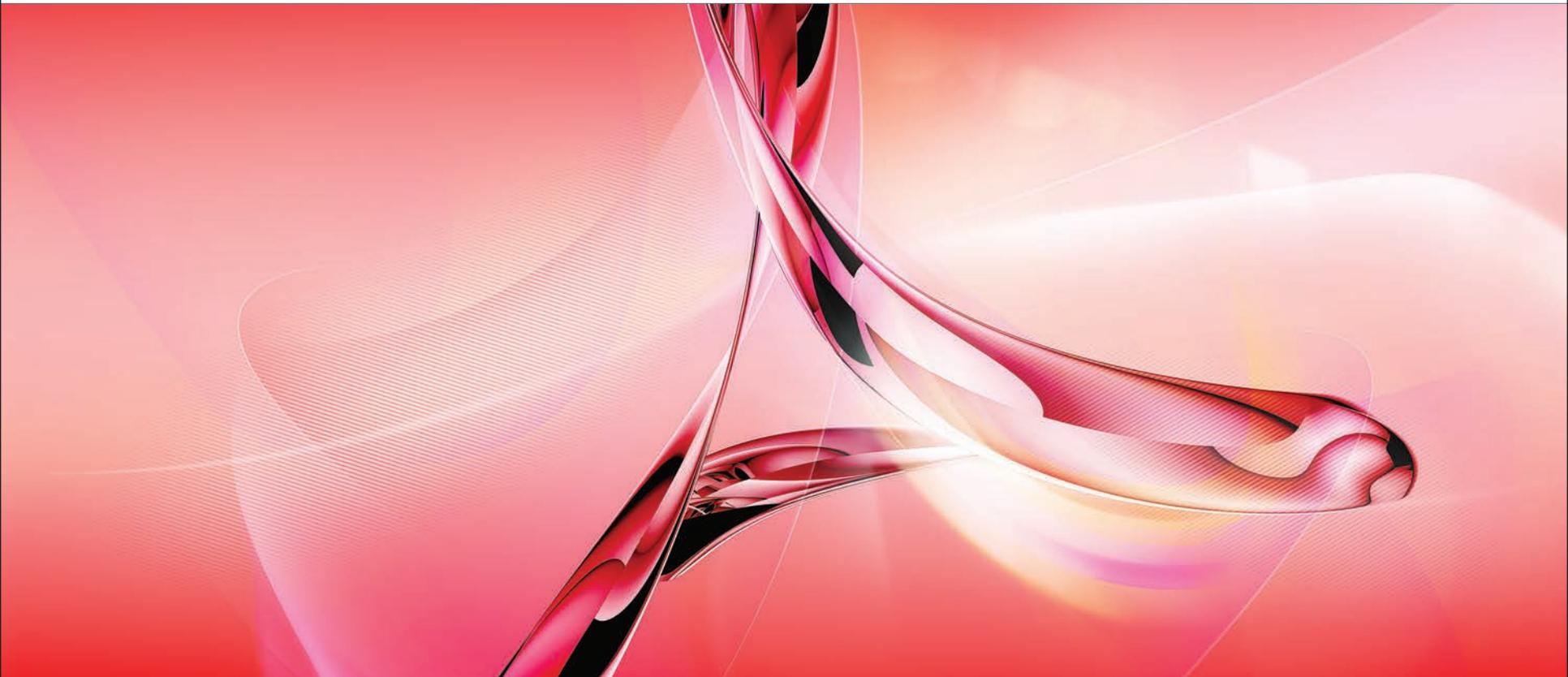
- PDF format introduced by Adobe with Acrobat 1 in 1993

- Immediate specification publication
  - No license required from Adobe to generate or consume PDF files via third party software
  - Rapid growth of PDF ecosystem

- Adobe responsible for all additions and updates to the specification based on
  - Needs of Adobe's Acrobat, graphics arts, and enterprise products
  - Industry & end user feedback

- PDF subset specifications based upon Adobe PDF
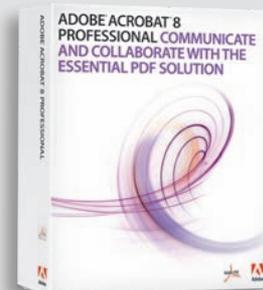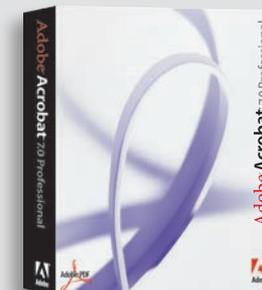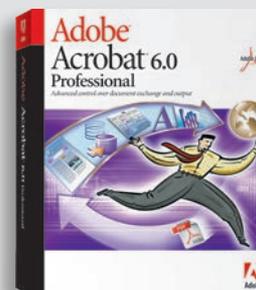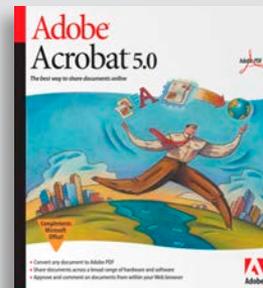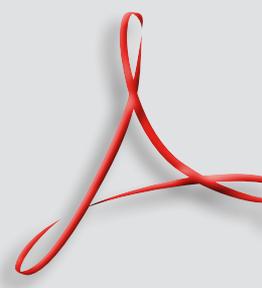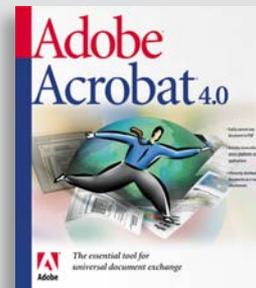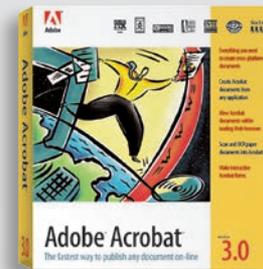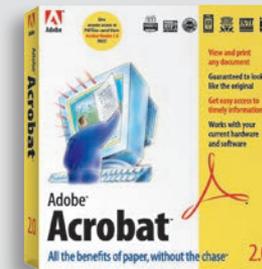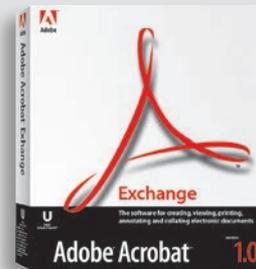
# PDF as an ISO Standard

## ISO PDF 32000-1

- Published by ISO TC 171 in 2008
- Base is Adobe PDF 1.7
- Provides mechanisms for vendor extensions to PDF
- Implemented in Acrobat 9 and Acrobat X and some third party products
- Serves as the basis for some new ISO PDF subset standards

## ISO PDF 32000-2

- Currently under development by ISO TC 171
- Expected approval and publication in 2012 as PDF 2.0
- Features include:
  - Formal support for extensions already being incorporated into PDF/UA and PDF/VT standards
  - Color improvements
    - Spot color enhancements
    - Per-page output intents
    - Overprint handling
    - Black point compensation
  - Flash / SWF integration
  - Reader requirements

# PDF Subset Standards

- PDF specification is very complex
  - PDF has a immense array of features & options accommodating the legacy of PostScript in addition to new functionality
  - PDF was *not* designed primarily for printing
  - PDF was designed by engineers
- Fear of use of the full PDF specification for specific purposes
  - How do you print an embedded movie? Annotations? Form fields?
  - Javascript?
  - Blind exchange and archiving?
  - What is *safe*?
- Stakeholders move to define task-appropriate PDF subsets

# What is PDF/X?

**PDF/X** is a family of graphic technology standards that standardize the used of the **PDF** for e**X**change of print-ready material

- Identifies a subset of PDF objects that may be used with restrictions to the use, or form of use, of those objects and/or keys within those objects

- Goal – if a sender and receiver of a data file use applications that conform to the same PDF/X specification, then the received file will print exactly as the sender intended – no surprises!

- PDF/X developed jointly by ANSI CGATS (Committee for Graphic Arts Technologies Standards) and ISO/TC 130

Extracted from *ISO Bulletin*, January 2002

# PDF/X Standards

## PDF/X-1a:2001

- Complete exchange of CMYK & spot color data based on PDF 1.3 (i.e., no live transparency) – *blind exchange*

- Provides for either embedding of output intent ICC profile or naming an "output condition"

- Supported by Adobe CS applications, Adobe Acrobat, and virtually all professional PDF workflow and prepress software; *not* supported by PDFMaker

- Very reliable when the generator of the PDF file knows the *exact* final printing conditions

- May be *very problematic* in many 21st century print workflows:

  - Original content uses live transparency

  - The generator of the PDF file does not know the exact final printing conditions

  - The print service provider needs the ability to retarget the PDF file for differing print conditions

- Considered to be the de facto professional PDF printing standard

# PDF/X Standards

## PDF/X-1a:2003

- Updated version of PDF/X-1a:2001 based on PDF 1.4 but *without* any support for live transparency

- Supported by Adobe CS applications and Acrobat; *not* supported by PDFMaker

- Has the same basic issues and limitations as PDF/X-1a:2001

- Virtually ignored by the professional printing community

## PDF/X-2

- Exchange of CMYK, spot color, and color-managed data with support for external content via *Reference XObjects* based on PDF 1.4 but *without* any support for live transparency – not *blind exchange*

- No known application or RIP support

- Officially abandoned by ISO in October 2010

# PDF/X Standards

## PDF/X-3:2002

- Complete exchange of CMYK, spot color, and color-managed data based on PDF 1.3 (i.e., no live transparency) – *blind exchange*

- Provides for either embedding of output intent ICC profile or naming an "output condition"

- Supported by Adobe CS applications, Adobe Acrobat, and most professional PDF workflow and prepress software; *not* supported by PDFMaker

- Has the same basic issues and limitations as PDF/X-1a:2001 although more retargetable

- Utilized to some degree in Europe, but virtually no traction elsewhere in the world

## PDF/X-3:2003

- Updated version of PDF/X-3:2002 based on PDF 1.4 but *without* any support for live transparency

- Supported by Adobe CS applications and Acrobat; *not* supported by PDFMaker

- Virtually ignored by the professional printing community

# PDF/X Standards

## PDF/X-4:2008

- Complete exchange (*blind exchange*) of CMYK, spot color, and color-managed data based on PDF 1.6 adding support for

    - Live transparency

    - Improved compression:  JPEG2000 and compressed XRefs & Streams

    - PDF layers (with restrictions)

- Requires the embedding of an output intent ICC profile

- Supported by Adobe CS4 & CS5, Adobe Acrobat 9 & X, RIPs / printers using the Adobe PDF Print Engine, and some professional PDF workflow and prepress software; *not* supported by PDFMaker

- The next generation de facto professional PDF printing standard

## PDF/X-4:2008p

- Same technical requirements as PDF/X-4:2008 except that a URL is used to point to the output intent ICC profile

- Supported by Acrobat 9 & X, RIPs and printers using the Adobe PDF Print Engine, and some professional PDF workflow and prepress software; *not* supported by PDFMaker

## PDF/X-4:2010 & PDF/X-4p:2010

- Eases restrictions on use of PDF layers for *and officially replaces* PDF/X-4:2008 & PDF/X-4p:2008

- Supported by Acrobat X, RIPs and printers using the Adobe PDF Print Engine, InDesign 7.5 PDF export, and some professional PDF workflow and prepress software; *not* supported by PDFMaker

# PDF/X Standards

- ## PDF/X-5:2008

  PDF/X-4:2008 with support for additional features via three conformance levels

  - ### PDF/X-5n:2008

    - *n-color* output is supported via a a URL is used to point to an *n-color* output intent ICC profile

    - No known current support

  - ### PDF/X-5g:2008

    - External graphics via use of Reference XObjects

    - Necessary for PDF/VT-2 support

    - Supported by Acrobat 9 & X, RIPs and printers using the Adobe PDF Print Engine, and some professional PDF workflow and prepress software; *not* supported by PDFMaker

- ## PDF/X-5pg:2008

  - External graphics via use of Reference XObjects *and* a URL is used to point to the output intent ICC profile

  - Supported by Acrobat 9 & X, RIPs and printers using the Adobe PDF Print Engine, and some professional PDF workflow and prepress software; *not* supported by PDFMaker

- ## PDF/X-5:2010

  - Eases restrictions on use of PDF layers for *and officially replaces* all three conformance levels of PDF/X-5:2010

  - Similar support as PDF/X-5:2008

# PDF/X Version Comparison

| | PostScript (2 & 3) | PDF/X-1a : 2001 | PDF/X-3 : 2002 | PDF/X-4 & PDF/X-4p | PDF/X-5 |
|---|---|---|---|---|---|
| **Based on PDF version** | N/A | **1.3** *Acrobat 4* | **1.3** *Acrobat 4* | **1.6** *Acrobat 7* | **1.6** *Acrobat 7* |
| **Color Support** | Device & Color-Managed CMYK, Gray, & RGB; Spot | Device CMYK & Gray; Spot | Device CMYK & Gray; Spot; Color-Managed CMYK, Gray, & RGB | Device CMYK & Gray, Spot; Color-Managed CMYK, Gray, & RGB | Device CMYK & Gray, Spot; Color-Managed CMYK, Gray, & RGB |
| **Color Management** | PostScript CIE-based Color Management | ICC Color Management (Output Profile/Condition) | ICC Color Management | ICC Color Management (External output profile for PDF/X-4p) | ICC Color Management (External output profile for PDF/X-5pg; n-colorant external profile for PDF/X-5n) |
| **Live Transparency** | **NO** Application "flattened" | **NO** Application "flattened" | **NO** Application "flattened" | **YES** | **YES** |
| **Layer Support** | **NO** | **NO** | **NO** | **YES** | **YES** |
| **Page Independence & Random Access** | **NO** | **YES** | **YES** | **YES** | **YES** |
| **Blind Exchange** | **NO** | **YES** | **YES** | **YES**  (PDF/X-4 only) | **NO** |
| **Print Job Control** | Normally **Internal** via `/setpagedevice` | **External** (Possibly via JDF) | **External** (Possibly via JDF) | **External** (Possibly via JDF) | **External** (Possibly via JDF) |
| **Image & Object Optimization** | **NO** | **Available** | **Available** | **Available** | **Available** (PDF/X-5g & PDF/X-5pg support *Reference XObjects*) |
| **Typical File Size** | **Large** | **Compact** | **Compact** | **Compact** | **Compact** |
| **Normal Overall Characterization** | **Highly Device-Dependent** | **Device-Dependent** | **Device-Dependent** (due to flattened transparency) | **Device-Independent** | **Device-Independent** |

Adobe

# Future PDF/X Standards Work

- Based on ISO 32000-2 PDF standard as opposed to older Adobe PDF standards

- Enhancements for Packaging

- Support for multiple output intents for different document parts (example:  cover versus inside pages)

- Accommodation of both optimized printing and display intents

- Office document color support

- Commonality with PDF/A, PDF/UA, and PDF/E

- Document security; encryption

- Others?

- Next PDF/X standards very unlikely prior to ratification and publication of ISO 3200-2 in late 2012 or 2013

- We are very open for ideas to update PDF/X consistent with its basic missions associated with PDF rendering for print!

# Q & A