

ISO 32000-2:2017

PDF 2.0 is here!



- **Project Co-Leader of ISO 32000-2**
 - With Duff Johnson
(USA, PDF Association Executive Director)
- **Understand some of the key changes in PDF 2.0**
 - End user perspective
- **Help you prepare for PDF 2.0**



*Think about how you can leverage
PDF 2.0 for better business value...*



The path to PDF 2.0

ISO 32000
Project Leaders

Duff Johnson
and
Peter Wyatt

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- June 1993 – 24 years since Adobe PDF 1.0
- Since 2008 - 2 ISO drafts / year for review
- ISO 32000-2 (PDF 2.0) – published **2017-05-xx**
- *Updated subset standards coming soon...*

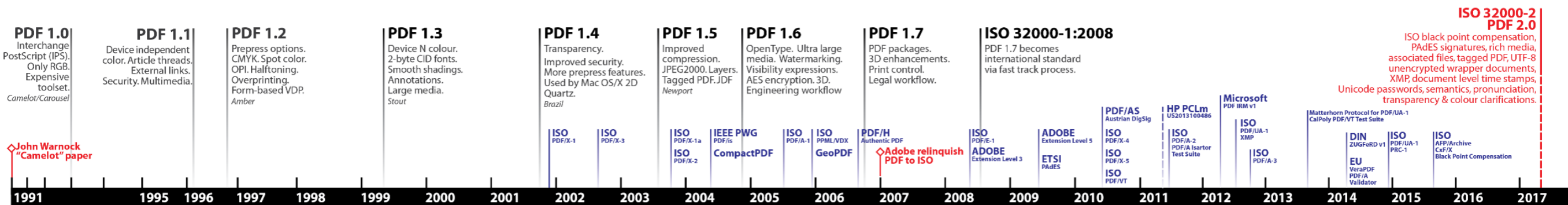


ISO 32000 - Core PDF Standards



Some statistics

PDF Reference	Date	Pages	Random Facts
Adobe PDF 1.0	June 1993	230	43 tables, 42 figures
Adobe PDF 1.1	23 January 1996	302	20 references
Adobe PDF 1.2	12 November 1996	394	137 tables, 86 examples
Adobe PDF 1.3	July 2000	696	223 tables, 73 figures
Adobe PDF 1.4	December 2001	978	277 tables, 20 colour plates
Adobe PDF 1.5	August 2003	1172	333 tables, 70 figures
Adobe PDF 1.6	November 2004	1236	370 tables, 80 figures
Adobe PDF 1.7	October 2006	1310	389 tables, 98 figures
ISO 32000-1:2008 (PDF 1.7)	1 July 2008	756 (A4)	78 Normative References
ISO 32000-2:2017 (PDF 2.0)	? May 2017	~970 (A4)	5836 “shall”, 411 “should”



















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Who develops ISO 32000?

- **ISO Technical Committee 171:** *Document Management Applications*
- **Sub-Committee 2:** *Document files formats, EDMS systems and authenticity of information*
- **Working Group 8:** *PDF Specification*
- **= ISO TC 171 SC 2 WG 8**
<https://www.iso.org/committee/53674.html>

Type	Name
	ISO/TC 171 "Document management applications" ▾
	ISO/TC 171/AG 01 "Advisory group" ▾
	ISO/TC 171/SC 01 "Quality, preservation and integrity of information" ▾
	ISO/TC 171/SC 01/WG 08 "Trusted WORM Functionality and Technical Requirements" ▾
	ISO/TC 171/SC 01/WG 09 "Document management - Information stored electronically" ▾
	ISO/TC 171/SC 01/WG 10 "Archiving of electronic data -- Computer output microform (COM) / Computer output laser disc (COLD)" ▾
	ISO/TC 171/SC 02 "Document file formats, EDMS systems and authenticity of information" ▾
	ISO/TC 171/SC 02/WG 01 "Micrographics applications" ▾
	ISO/TC 171/SC 02/WG 02 "Electronic imaging applications" ▾
	ISO/TC 171/SC 02/WG 05 "Joint TC 171/SC 2 - TC 42 - TC 46/SC 11 - TC 130 WG; Document management applications - Application issues - PDF/A" ▾
	ISO/TC 171/SC 02/WG 07 "PDF/Engineering" ▾
	ISO/TC 171/SC 02/WG 08 "PDF specification" ▾
	ISO/TC 171/SC 02/WG 09 "PDF universal accessibility" ▾
	ISO/TC 171/SC 02/WG 10 "Preservation file format guidelines" ▾
	ISO/TC 171/SC 02/WG 11 "EDMS Guidelines" ▾
	ISO/TC 171/TF 01 "Micrographics Standards Maintenance" ▾



- “P” and “O” national member bodies and liaison organizations (PDF Association)
- ANSI / AIIM Standards Program and secretariat
- ISO- or PDF Association-registered Subject Matter Experts (SMEs)
 - *Registration is necessary to attend ISO meetings*
- Other invited Subject Matter Experts
- Project Leaders (PLs)

22

published ISO standards*
under the direct responsibility of ISO/TC 171/SC 2

9

ISO standards under development*
under the direct responsibility of ISO/TC 171/SC 2

19

Participating countries

9

Observing countries



- Chair Working Group meetings
- Process and manage comments on the document
 - Formal commenting process: submit → suggested disposition of comment by PLs → review & discuss in meetings → update document
- Perform all editing
- Manage document quality & consensus

James King, Adobe 2008 - 2011

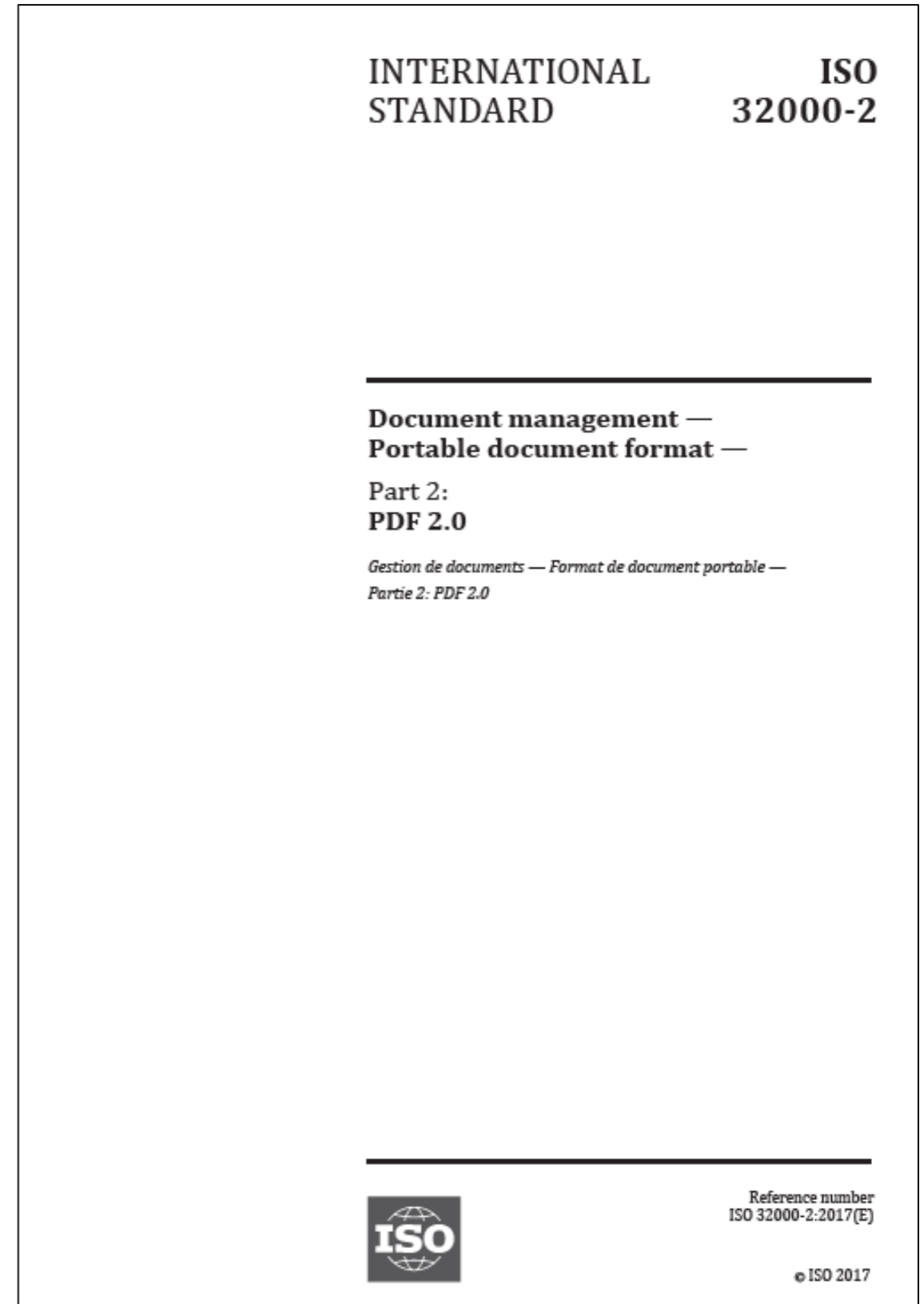
Cherie Ekholm, Microsoft 2011 - 2015

Duff Johnson, consultant 2011 -

Peter Wyatt, CiSRA (Canon) 2015 -



- *Finalising document as we speak...*



Changes



Guiding Principles

- **#1 = Backwards compatible**
 - Aligned with common implementations & current user expectations
- **Feature rich for all users & all use cases**
 - Sub-set standards can prohibit, restrict, constrain, etc.
- **Describe both interactive and non-interactive processing**
- **Change from "conforming reader" to conforming files**
- **Precise descriptions** without being overly prescriptive
 - **Retain precise appearance** (imaging model)
- **Improved clarity, less ambiguities & many corrections**
- **References non-proprietary technologies**
 - Uses latest open standards as much as possible
- **Improved cross-referencing & usability** of the standard
 - *No one will read all 970 pages!*



- **The key value proposition of PDF**
 - Reliable, portable, fixed layout, self-contained, deterministic appearance, author control, ...
 - Wide range of use cases & applications
 - Open & closed workflows
- **The technical fundamentals of PDF**
 - File structure
 - Syntax & grammar
 - *Many, many things...*

PDF 2.0 is an evolution, not a revolution!



- Conforming processor requirements recast as conforming file requirements where possible
 - Easier to test & validate
 - Requires PDF writers to create valid files
- Distinction between interactive and non-interactive processor requirements
- **No requirement to implement all of PDF 2.0!**
 - *But for every feature you choose to implement, you “shall” comply!*



- **ISO 32000-2 has 91 Normative References**
 - *And 50 Bibliographic references*
 - ISO 32000-1:2008 had 78 Normative & 41 in Bibliography
- **Resulting from:**
 - Detailed technical review
 - Clear references to other specifications
 - Open vendor-neutral standardised technologies
 - Many technologies are now RFCs, ISO standards, etc.
 - Ensuring all reference materials are available
 - Updated withdrawn or superseded specifications
 - Updated technology
- **Examples**
 - Unicode 4.0 → Unicode 8.0
 - FIPS PUB 186 DSA Signatures January 2000 → June 2009



- **UTF-8 support**
 - Stronger alignment with other data formats such as XML
- **Avoid processing problems & consistency with ISO subset standards**
 - File IDs now required
 - Length (/L) required for inline images
- **Consistency of appearance**
 - Clarification of resource inheritance
 - Handling of dashing & degenerate lines
 - Required appearance streams (/AP) for annotations
 - Halftone origin (/HTO)
- **Better user experience**
 - Thumbnails for embedded files, Enforced print scaling, Collection navigation



“Substantially rewritten”

- 10.1 – 10.3, Rendering
- 11, Transparency
- 12.8, Digital Signatures
- 14.3, Metadata
- 14.8, Tagged PDF
- 14.9, Accessibility support
- **To improve interoperability & ensure consistent implementations**



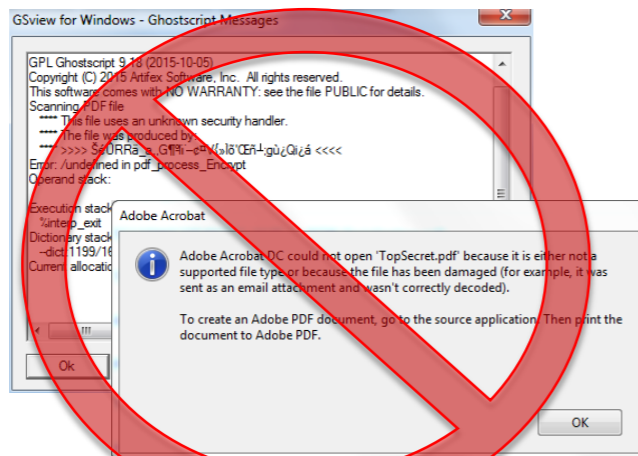
All-new features

- 7.6.7, Unencrypted wrapper document
- 8.6.5.9, Use of black point compensation
- 12.5.6.24, Projection annotations
- 12.8.3.4, CAdES signatures as used in PDF
- 12.8.4, Long term validation of signatures
- 12.8.4.3, Document Security Store (DSS)
- 12.10, Geospatial features
- 13.7, Rich media annotations
- 14.7.4, Namespaces for tagged PDF
- 14.9.6, Pronunciation hints
- 14.12, Document parts
- 14.13, Associated files
- Support for PRC (3D)
- Support for UTF-8
- Per-page Output Intents
- Annex O, Fragment Identifiers



Unencrypted wrapper document

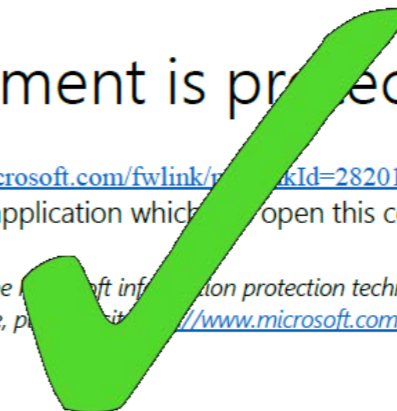
- Custom security handlers are permitted, providing flexibility
- Unencrypted wrappers allow for a “cover page” and guidance regarding the security in use
- Software with appropriate handlers may open the encrypted document directly
- **Better user experience for non-standard security**



This document is protected

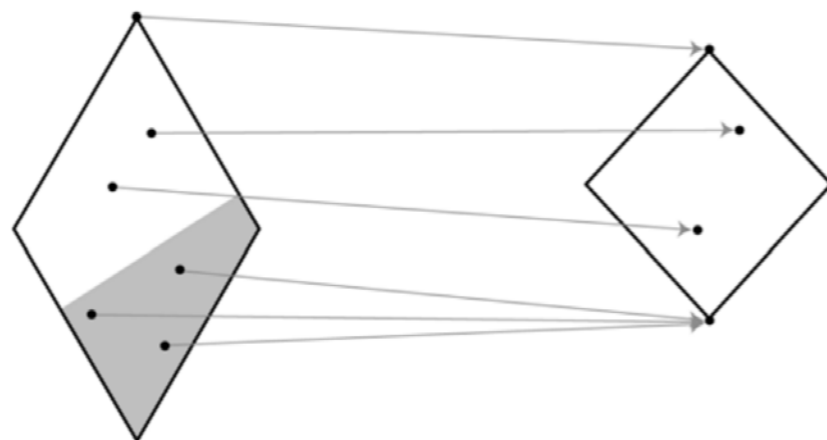
See: <http://go.microsoft.com/fwlink/?LinkId=282017>
to find an updated application which can open this content

To learn more about the Microsoft information protection technology used to protect this file, please visit <http://www.microsoft.com/RMS>

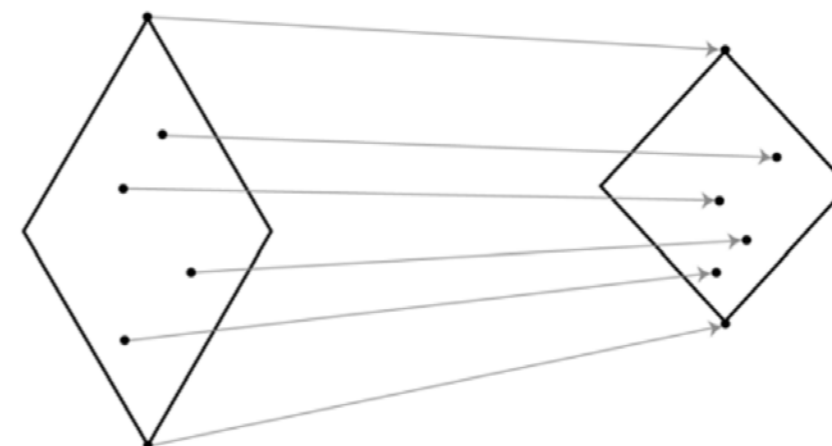


- Black Point Compensation enables details in shadows to be retained by utilising all available black levels in an output device
- Defined per-object in PDF 2.0
- Uses ISO 18619:2015 Black Point Compensation algorithm
- **Enables better & more consistent output of darker images**

Without BPC



With BPC



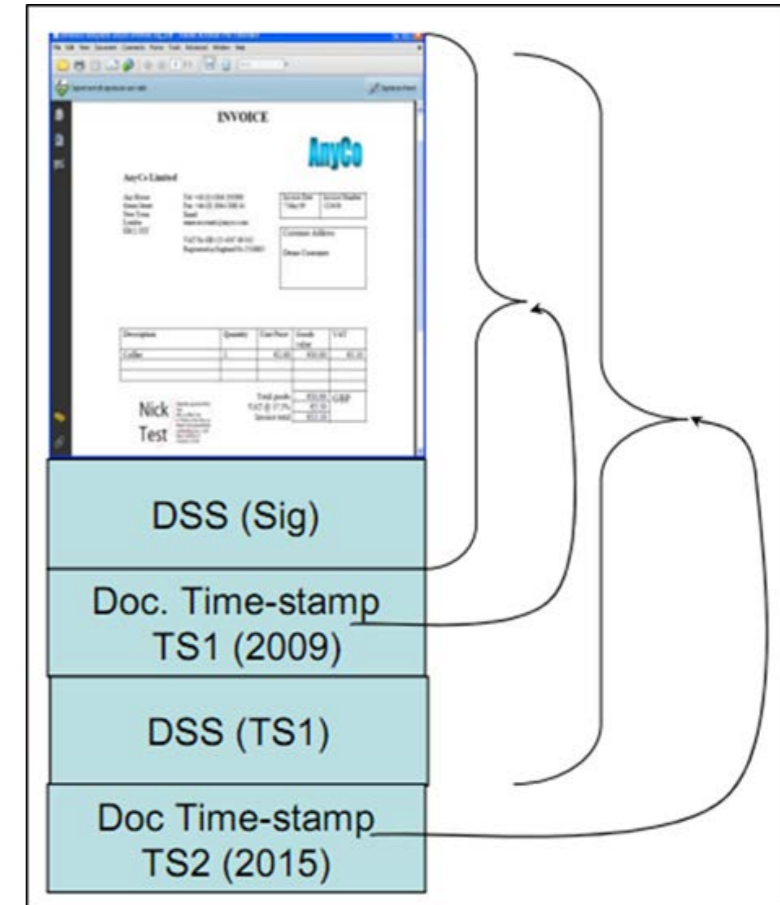
- New **Projection, 3D** and **RichMedia** annotations
 - **RichMedia** replaces Movie and Sound annotations, providing a common format-neutral framework for video, audio, animations and other multimedia
 - 3D projections for Geospatial3D and 3D measurement units
- Tab ordering control of fields & annotations
- Transparency and blend mode attributes for annotations
- PRC support for 3D content
 - ISO 14739-1:2014 *Document management - 3D use of Product Representation Compact (PRC) format - Part 1: PRC 10001*
- **Enables better rich media & 3D experiences in PDF**
- **Enables better user experience for review & comment workflows**



- **Aligns PDF's capabilities with EU and ETSI Digital Signature standards**



- **Document Security Store (DSS)** dictionaries
 - Validation Related Information
 - Certificate Revocation Lists
 - Certificate Status Protocol (OCSP) responses
- **Document Time-Stamp (DTS)** dictionaries
 - “... establishes the exact contents of the complete PDF file at the time indicated in the timestamp token”
- **Supports collection of validation information to verify signatures at a later time.**
- **Enables workflows with strong integrity & trust**



- Establishes new PDF data structures supporting geospatial coordinate systems
- Supports latitude, longitude, altitude in real-world units
 - e.g. metre, kilometre, foot, mile, nautical mile, hectare, acre, ...
- Can define transformations between 3D curved geographic coordinate systems (*the real world*) and a 2D coordinate system (*the PDF page*) to correct for distortions.
- **Enables PDF use cases for maps and satellite imagery**



- **A restructured semantics model with a revised tag-set, namespaces and much more**
- Namespaces for identifying and exchanging custom structure types in tagged PDF
- MathML support
- A facility for adding phonetical information via a phoneme attribute added to a structure element in a tagged PDF (Pronunciation Hints)
- Tagged PDF in PDF 2.0 is **much cleaner** (*fewer tags*), **much clearer** (*better descriptions of tags, clear indication where they can/cannot be used*) and **more flexible / open ended** (*restrictions exist only where necessary*).



- Originally defined in PDF/VT (ISO 16612-2:2010)
- Descriptive metadata for PDFs made up of multiple sub-documents
 - e.g. mail merge variable data documents, booklets (cover + body), collation of multiple documents
- PDF page ordering is decided at creation to suit a certain workflow
 - Workflows requiring a different page order can use DPM to “understand” the context of a document part / page
- New structures include:
 - DPartRoot dictionary
 - DPart dictionaries
 - Document parts metadata (DPM)
- **Enables enhanced workflows for multi-part documents without modifying the file or creating another PDF**



Associated Files (AF)

- Associated Files provide a “... means to associate content in other formats with selected objects of a PDF file and to identify the relationship between them.”
 - Object can be anything: PDF document, page, graphics object, a structure element, annotation, ...
- **AFRelationship** describes the semantic relationship
 - e.g. Source, Data, Alternative, Supplement, EncryptedPayload, FormData, Schema
- PDF 2.0 does not give explicit instructions on how to process
- **Enables new capabilities via semantic relationships between PDF objects and other arbitrary data**

attach MathML to equation graphics
attach spreadsheet or raw data to chart graphics
attach business XML to an electronic invoice
attach bibliographic data to references



- XMP = eXtensible Metadata Platform
 - XML-based metadata commonly used across many file formats
 - Many systems know how to understand & index
- XMP is ISO 16684-1:2012 Graphic technology - Extensible metadata platform (XMP) specification - Part 1: Data model, serialization and core properties
- XMP Metadata is now a “first class” requirement of PDF 2.0
 - Fully aligned with all ISO subset standards
 - Can also attach XMP Metadata to any PDF object
 - Can encrypt metadata with AES 256 bit
- The original “DocInfo” metadata model is deprecated
- **Enables easier, richer search & indexing**
 - **Consistency with PDF/A, PDF/E, PDF/UA, PDF/X, PDF/VT**



New capabilities for existing features

- Transparency and blend mode attributes for annotations
- Stamp Annot intent
- Polygon/Polyline real paths
- 256-bit AES encryption
- Unicode passwords
- ECC-based certificates
- Document requirement extensions
- New tab order (for fields) values
- Page-level OutputIntents
- Referenced (external) OutputIntents
- Thumbnails for embedded files
- Halftone Origin
- Measurement & Point Data for image & form Objects
- Extensions to OutputIntents, MixingHints and SpectralData
- L(ength) key for inline image data
- Viewer preferences enforcement (of print scaling)
- GoToDPart and RichMediaExecute actions
- Extension to GoTo and GoToR to support linking to a specific structure element
- Extension to Signature Field Locks and Signature Seed Values
- Extensions to 3D viewing conditions, incl. transparency, 3D measurements
- New DocumentFragment, Aside, Title, Sub, Em, Strong, FENote and Artifact structure elements
- New PageNum, LineNum, Bates and Redaction artifact types
- Support for MathML and RDFa in tagged PDF



- Output intents (PDF 1.4) provide a means for matching the colour characteristics of a PDF document with those of a target output device...
 - Output intents are ICC profiles
 - Output intents override working spaces during viewing & printing
- **Ensure consistent colour reproduction across devices**
- PDF 1.x defined output intents per-document
 - Utilised by PDF/A, PDF/X, PDF/VT and PDF/E
- PDF 2.0 now also allows per-page output intents
 - Also allows referencing of external output intents
- **Enables easier collation and imposition of pages**
 - Especially for PDF/A, PDF/X and PDF/E workflows



- Inheritance of transparency colour spaces
- Clarifications on when object colours must be transformed to the blend colour space
- **ColorDodge & ColorBurn** blend mode formula corrections
- Spectral data for spot colours & output intents
 - ISO 17972-4:2015 Graphic technology - Colour data exchange format (CxF/X) - Part 4: Spot colour characterisation data (**CxF/X-4**)
- 3D viewing conditions
- Transparency with 3D objects & annotations
- **Enables consistent appearance across implementations**
 - Matches common implementations
 - Better 3D user experience
 - New use cases (e.g. advanced printing technologies)



deprecated

part of ISO 32000 that should not be written into a PDF 2.0 document, and should be ignored by a reader

NOTE 1 In some cases variations on these restrictions on continued use of a deprecated feature are explicitly stated in this part of ISO 32000.

NOTE 2 Implementers are cautioned that some features that are deprecated in this part of ISO 32000 could have tighter constraints placed on them, or even be removed completely, in a later version of ISO 32000, or in subset standards such as PDF/X (ISO 15930), PDF/A (ISO 19005), PDF/E (ISO 24517), PDF/VT (ISO 16612) and PDF/UA (ISO 14289).

- Old, unused, proprietary, insecure stuff...
- *Note that the wording says “**should not**”!*



Deprecations

- XFA (incl. NeedAppearances)
- Movie, Sound & TrapNet annotations
- Movie and Sound Actions
- Info Dictionary
- Assistive technology restrictions via DRM
- PostScript aspects: ProcSet, PSXObject
- Page-piece dictionaries
- OS-specific file specifications
- SHA1 for security
- OS-specific aspects: Launch actions, filenames
- Encryption of FDF files
- Names for Objects & Fonts
- All encryption methods except AES-256
- Arrays of Blend Modes
- OPI
- Transfer Functions
- Alternate Presentations
- CharSet (for T1 fonts)
- CIDSet (for CID fonts)
- Prepress viewer preferences
- adbe.pkcs7.sha1 & adbe.x509.rsa_sha1
- Suspects flag in MarkInfo dict.



How to use the ISO 32000-2 document

■ Don't:

- Just search for “*PDF 2.0*” as markers for changes
- Rely on sub-clause *0.3 Changes introduced in this document*
- Try to diff with ISO 32000-1:2008

■ Do:

- Read all the words carefully
- Follow the cross references to useful information elsewhere in the document
 - Including new Annexes
- Use it to help you understand ISO 32000-1:2008
 - “*This document is also suitable for interpretation of files made to conform to any of the previous Adobe PDF specifications 1.0 through 1.7 and ISO 32000-1*”



Conclusion

- **PDF 2.0** is the first core PDF standard **developed entirely under ISO guidelines & processes**
 - International, Open, Vendor neutral, Collaborative
- ISO 32000-2:2017 PDF 2.0
 - **Backwards compatible**
 - **Many new features**
 - **Improved clarity, less ambiguities & lots of corrections**
 - **Supports non-proprietary technologies & open standards**
 - **Improved cross-referencing & usability** of the standard
- **Enabling a solid foundation for**
 - **New use cases, capabilities & workflows**
 - **Improved interoperability & consistent implementations**

Now is the time to start preparing your business & workflows!



- *You too can participate in ISO standards development!*
- Via the PDF Association's ISO "Category A" liaison
- Directly via your own country's ISO Member Body
 - DIN in Germany, ANSI in the US, AFNOR in France, BSI in UK, etc.
- *Join us as we continue to push PDF forwards!*

