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Graphic technology — Variable data exchange —

Part 2:
Using PDF/X-4 and PDF/X-5 (PDF/VT-1 and PDF/VT-2)

Technologie graphique — Échange de données d'impression variables —

Partie 2: Utilisation de PDF/X-4 et PDF/X-5 (PDF/VT-1 et PDF/VT-2)

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Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16612-2 was prepared by Technical Committee ISO/TC 130, *Graphic technology.*

ISO 16612 consists of the following parts, under the general title *Graphic technology — Variable data exchange*:

— *Part 1: Using PPML 2.1 and PDF 1.4 (PPML/VDX-2005)*

— *Part 2: Using PDF/X-4 and PDF/X-5 (PDF/VT-1 and PDF/VT-2)*

Introduction

This part of ISO 16612 defines the PDF/VT document format which specifies methods for the use of the Portable Document Format (PDF) for the definition and exchange of all content elements and supporting metadata necessary for printing tasks involving variable or transactional document content. It allows the specification of document structure, document layout, content data, and interaction of graphical elements in a graphics model that supports transparency.

PDF/VT is designed to enable variable document printing (VDP) in a variety of environments from desktop printers to digital production presses. This includes hybrid workflows involving both conventional and digital printing.

This part of ISO 16612 defines three conformance levels as follows.

— PDF/VT-1 for a complete single-file exchange. PDF/VT-1 requires all resources necessary for proper interpretation of the PDF data to be included within the conforming PDF file.

— PDF/VT-2 for multi-file exchange. PDF/VT-2 enables a conforming file to refer to an external ICC profile file and additional content defined in external PDF/X conforming files for use as page content.

— PDF/VT-2s for streamed delivery. PDF/VT-2s allows for processing (streaming) of multiple compound entities representing graphical content before the entire PDF/VT instance has been generated. A PDF/VT-2s stream is a MIME package that contains a sequence of one or more PDF/VT files and supporting resources.

The present trend towards the separation of variable document content creation from the details of print production workflow and printing device dependencies is evolving rapidly. The job definition format (JDF) job ticket specification being developed by the International Cooperation for the Integration of Processes in Prepress, Press, and Postpress Organization (CIP4) provides one means of specifying a print product and corresponding production process in a way that is independent of any particular graphical content format.

PDF/VT is intended to be workflow-architecture-neutral. PDF/VT has no provision for encoding workflow or device-specific control information. The aspects of device control, resource, and production management are outside the scope of this part of ISO 16612. In a production environment, PDF/VT relies on the use of JDF, or similar job ticket formats, to define a print product and the corresponding production requirements. The primary focus of PDF/VT is on the exchange of content between businesses or within an integrated environment that produces variable document printing.

Graphics design applications continue to evolve with greater capability and increased sophistication of the graphical content and design effects based on a graphics model that supports transparency. This graphics model is required to support features such as drop shadows and colour blending effects that are associated with the interaction of transparent content objects. These capabilities are used in the creation of one-to-one customer communication print applications including direct marketing documents, transactional documents, and trans-promotional documents.

This part of ISO 16612, referred to as PDF/VT, includes support for the PDF 1.6 imaging model which includes support for transparency. It builds on the PDF/X-4 and PDF/X-5 standards (defined in ISO 15930-7 and ISO 15930-8), which, in turn, reference PDF 1.6. Like ISO 16612-1, this part of ISO 16612 guarantees portability of conforming VDP content and metadata across conforming digital printing systems. It is focused on defining the content data and metadata necessary to support efficient workflow manipulation and processing based on the use of JDF or similar job ticket formats. More specifically, the job ticket is expected to define the production requirements and draw upon PDF/VT for its content and metadata resources.

This approach supports the fundamental requirements of portability, device and workflow independence and guaranteed communication of the intended colour reproduction. The native constructs within PDF allow products to provide functionality equivalent to that of PPML workflows as used in ISO 16612-1. This part of ISO 16612 uses a single homogeneous format while adding support for a graphics model that supports transparency, including support for interacting transparent objects.

This part of ISO 16612 is based on PDF/X-4 and PDF/X-5 allowing users to continue to use, and solution vendors to build on, existing PDF-based workflow tools and job-ticket-based VDP workflow architecture similar to PPML/VDX, with the added capability of the full graphics model of PDF 1.6.

PDF/VT supports the use of graphical object definitions as a method of specifying graphical content data only once in a PDF/VT file independent of the number of times it is referenced in the file. This approach serves to reduce the file size of a PDF/VT instance and allows implementers of conforming readers to employ various processing optimization strategies. Within the context of PDF/X-4, these graphical objects are specified as image, form and transparency group **XObject**s. Use of PDF/X-5g and PDF/X-5pg allows for the use of reference **XObject**s where the **XObject's** content stream is that of a page of a referenced PDF file.

While strongly recommended, there is nothing in this part of ISO 16612 that enforces the creation of PDF/VT files that make efficient use of **XObject**s.

XObjects referenced multiple times from various content streams can be tagged with hint information that aids the conforming reader in its determination of **XObject** reuse. These hints include an explicit lifetime scope to indicate the context within which the **XObject** is known to be referenced multiple times, such as within the current file, across multiple files of a PDF/VT instance or across PDF/VT instances. An **XObject** can also be tagged with an identifier to assist a conforming reader in the identification and management of such recurring definitions, such as in the case where it is known to occur across multiple PDF/VT files.

An **XObject** can also be identified as an encapsulated **XObject** if its definition has a limited and well-defined interaction with the current graphic state when invoked. This explicit hint serves to assist a conforming reader in its optimization strategy.

This part of ISO 16612 enables an exchange of content where no additional technical information is required to be communicated between sender and receiver for the purpose of describing the appearance of page content.

Application notes for this part of ISO 16612 are available to provide assistance to developers and users of applications designed to conform to this part of ISO 16612 and can be found at http://www.npes.org/Standards/toolspdfvt.html.

A reader conforming to this part of ISO 16612 is not required to support documents conforming to ISO 16612-1, which is based on the use of PDF and PPML.

Graphic technology — Variable data exchange —

Part 2:
Using PDF/X-4 and PDF/X-5 (PDF/VT-1 and PDF/VT-2)

1 Scope

This part of ISO 16612 defines the PDF/VT document format and methods to enable reliable document exchange for variable data and transactional (VT) printing. It uses the Portable Document Format (PDF) Version 1.6, as restricted by PDF/X-4 and PDF/X-5, for the representation of such documents. It allows the specification of document structure and layout, content data, and interaction of graphical objects in a graphics model that supports transparency and both device-dependent and device-independent colour spaces. All elements are either included or provision is made for unique identification of externally supplied graphical content or ICC profiles.

PDF/VT is designed to enable variable data and transactional printing in a variety of environments from desktop printers to digital production presses. This includes hybrid workflows involving both conventional and digital printing.

This part of ISO 16612 does not provide for the specification and encoding of production and device control information but is constructed to enable its use with the CIP4 Job Document Format (JDF) or similar job ticket formats.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15930-7, *Graphic technology — Prepress digital data exchange using PDF — Part 7: Complete exchange of printing data (PDF/X-4) and partial exchange of printing data with external profile reference (PDF/X-4p) using PDF 1.6*

ISO 15930-8, *Graphic technology — Prepress digital data exchange using PDF — Part 8: Partial exchange of printing data using PDF 1.6 (PDF/X-5)*

Adobe PDF Reference, fifth edition, version 1.6., Adobe Systems Incorporated (ISBN 0-321-30474-8). Available from <http://www.npes.org/standards/toolspdfx.html>

Errata for the PDF Reference, fifth edition, version 1.6 dated 4 October 2006, Adobe Systems Incorporated. Available from <http://www.npes.org/standards/toolspdfx.html>

Extensible Markup Language (XML) 1.0 (Second Edition), 6 October 2000, World Wide Web Consortium, Available from <http://www.w3.org>

PDF Blend Modes: Addendum, 23 January 2006, Adobe Systems Incorporated. Available from <http://www.npes.org/standards/toolspdfx.html>

RFC 2045, *Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies*, November 1996. Available from <http://www.ietf.org/rfc/rfc2045.txt>

RFC 2046, *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types*, November 1996. Available from <http://www.ietf.org/rfc/rfc2046.txt>

RFC 2047, *MIME (Multipurpose Internet Mail Extensions) Part Three: Message Header Extensions for Non-ASCII Text*, November 1996. Available from <http://www.ietf.org/rfc/rfc2047.txt>

RFC 2183, *Communicating Presentation Information in Internet Messages: The Content-Disposition Header Field*, August 1997. Available from <http://www.ietf.org/rfc/rfc2183.txt>

RFC 4122, *A Universally Unique IDentifier (UUID) URN Namespace*, July 2005. Available from <http://www.ietf.org/rfc/rfc4122.txt>

XML Path Language (XPath), version 1.0, WC3 Recommendation, 16 November 1999. Available from <http://www.w3.org/tr/xpath>

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
compound entity
unit of work with all text, graphics and image elements prepared for final print reproduction and that might represent a single page for printing, a portion of a page or a combination of pages

3.1.2
document
collection of related document parts

NOTE   A document part can also be a document.

3.1.3
document part
set of related pages or related sets of pages, or both

EXAMPLE   Chapter pages of a book or all sets of pages intended for a recipient.

3.1.4
document part hierarchy
hierarchical data structure that specifies the organization of document parts

3.1.5
document part metadata
DPM
metadata associated with a document part

3.1.6
editor
application that is both a reader and a writer capable of modifying a file

3.1.7
encapsulated XObject
XObject having a well-defined limited interaction with the current graphics state at the point of invocation