PDF/VT – The ISO Standard for the Printing of Variable and Transactional Documents

Variable Data Printing (VDP), Transpromotion, PostScript, AFP

The fact that PDF is an ISO standard, and that there are subordinate standards for specialized purposes like PDF/X for document exchange and PDF/A for archiving, has become common knowledge in the field. In August 2010 the International Organization for Standardization (ISO) released a less-known PDF standard under the number ISO 16612-2, also called PDF/VT, which deals with the reliable document exchange for variable data and transactional (VT) printing. As so often happens, a reader can rarely identify the strategic impact of a standard based solely on the exact technically formulated name and content. This article therefore explains the motivation for creating the standard, describes several performance features, and indicates their possible ramifications on the future market.

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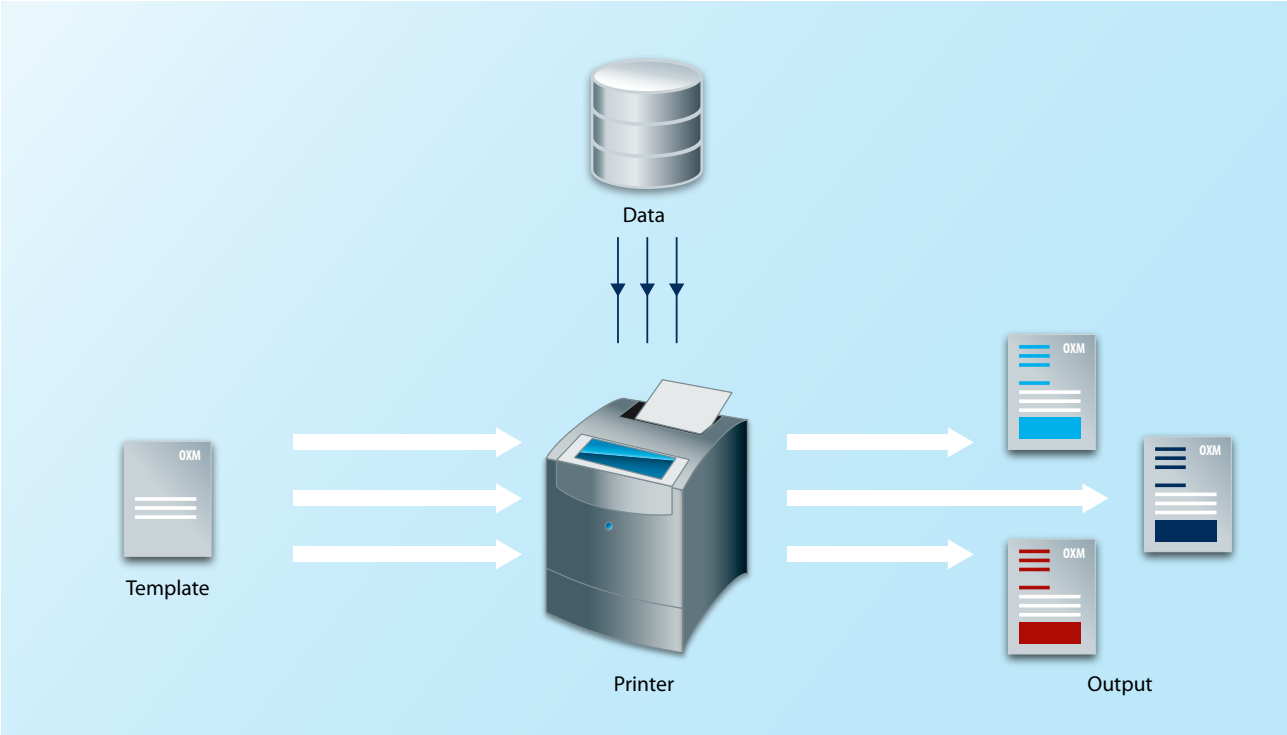
A New Market Is Created

Transactional documents like orders, delivery notices, invoices, payment reminders etc. record business transactions. Billions of these documents are printed, enveloped, franked and sent out every day. The virtually endless stream of direct marketing mails can be added to these numbers. The high numbers of print jobs and the requirements for short through-put times have not only led to the development of corresponding hardware like high-performance printers. Applications like Variable Data Printing (VDP) have been created. In these applications, document templates with variable data from databases, for example the names and addresses of customers, are merged in the printing machine and do not have to be prepared in advance as print jobs. With large volumes of pages this saves both an enormous amount of processing time as well as memory space, and can significantly reduce the cost per page. Technical advances in computer-supported customer relations (CRM) and in digital printing make the use of available empty spaces for up-to-date, targeted and personalized advertising messages possible. Market studies have shown that advertisements via transpromotion reach their target audience markedly better than accompanying pamphlets. It should come then as no surprise that large growth is projected for transpromotion.

But are print and preprint industries properly prepared for this?

- Transaction documents are still predominantly printed in black and white. The advertising messages require however a color reproduction.
- In addition, printer languages used like PostScript and AFP heavily restrict graphic possibilities. Designers who are used to desktop publishing with PDF/X do not want to accept compromises with respect to creativity.



The printing of variable data in color is a prerequisite for modern transpromotion

- Furthermore, production processes with highly differing formats like PostScript and AFP, proprietary metadata (which is predominantly suited for a specific intended use) and missing caching and blending can no longer be easily optimized. Printing service providers require on the contrary cost reductions and improved interoperability, and pose clear demands on modern, automated printing processes.

These facts, and the huge demand for a universal and standardized VDP solution, have led to the development of PDF/VT. Promises that were previously projected by VDP visionaries should now be fulfilled with PDF/VT.

The ISO Standard PDF/VT

Adobe announced the development of an own format for transactional printing already in 2008. Though at the same time, Adobe decided to conduct this development not alone, but jointly with other manufacturers in the industry. As a result, Adobe transferred ownership of the new format to the ISO committee.

Following intensive work in the ISO committee, PDF/VT was releasd as the new standard ISO 16612-2 in August 2010. The introduction states that the standard "…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. …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."

The primary focus of PDF/ VT is therefore the exchange of content between business units or within an integrated VDP production environment. At the same time, PDF/VT should remain neutral with respect to workflow. Device control, resource administration and production management are not included in the standard. In a production environment, PDF/VT relies on the use of JDF or a similar job ticket language to describe the print product and the related production conditions.

PDF/VT is based on the PDF 1.6 graphic model, which supports transparency. Transparency is necessary for supporting shadowing and color blending effects with backgrounds. In addition, PDF/VT is built on the well-known standards PDF/X-4 (ISO 15930-7) and PDF/X-5 (ISO 15930-8), which themselves are also based on the graphic model of PDF 1.6. In this way the standard ensures that VDP content and metadata can be flawlessly transferred between conforming digital printing systems.
In PDF/VT, graphic content can be defined once and used repeatedly. With respect to PDF/X-4 the recurring content (XObjects) includes images, text blocks and logos. With PDF/X-5 it also encompasses external content (Reference XObjects) which describe entire pages. Employing reusable objects can significantly reduce file size. The objects can also be supplemented with information about their repetitive use, both within the file as well as external to it. This enables conforming applications to better manage the life cycle of the objects.

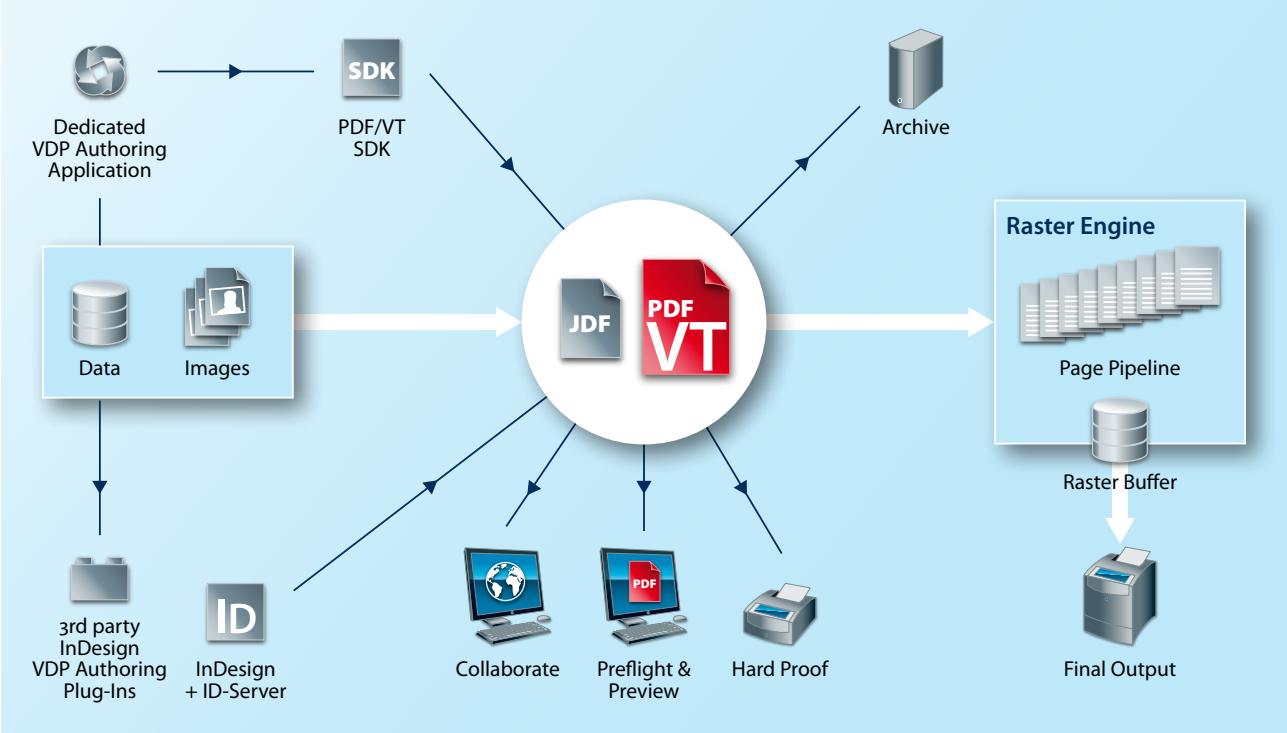
The Difference between PDF/VT-1, PDF/VT-2 and PDF/VT-2s

The ISO 16612-2 standard defines the following three levels of conformance:

- **PDF/VT-1** is applicable for the exchange of a single, complete file. The file contains all resources and content necessary for the error-free interpretation of the file.
- **PDF/VT-2** allows for the exchange of files, which reference external ICC profiles and external page content.
- **PDF/VT-2s** provides for the processing of data streams. The data stream is a MIME package that contains a sequence of one or more PDF/VT files and the referenced resources.

The Advantages of PDF/VT

Compared with the printing process widely used today, which only support black and white, PDF/VT offers the printing of simple process colors like CMYK through to spot colors and multi-channel colors. Color printing has as a prerequisite, that all levels in the process chain must more or less intensively deal with ICC color management. This will pose a challenge for many organizations and should not be underestimated.
The graphic model of PDF/VT is the same as for PDF/X, which for years has been the de-facto standard for graphic designers. PDF/X content elements, including images, logos and page descriptions which originate from common industry tools like Adobe InDesign, can be directly transferred into PDF/VT. Conversion processes like transparency flattening, that are necessary with PostScript and may result in undesirable side effects, can thus be avoided.
The related standards PDF/X and especially PDF/A require that the document may not contain any reference to external objects. PDF/VT on the other hand allows for repetitive elements like images, logos, text blocks and entire page descriptions to originate from external sources. In this way it is possible, for example by personalized campaigns, to keep the size of a print job small by calling up data from an external database, even if it includes numerous pages. Saving data externally offers additional advantages, for example when using sensitive data like credit cards details and invoices. If the print file is stored externally, the sensitive data does not need to be saved with it, increasing the privacy protection notably.
In addition PDF/VT allows for a large flexibility when configuring metadata. With a bulk mailing, for example, it must be ensured that the content can be grouped by receiver, zip-code or gender for enveloping or dispatching. In doing so, differences in the total number of pages, differences in text blocks or varying graphic elements have to be taken into consideration. The standardized form of the metadata also enables VDP applications to be more easily and economically implemented, since investing in additional, proprietary file formats for controlling the work process becomes obsolete.
One of the greatest strengths of PDF/VT is the support of data streams. PDF/VT pages, page ranges and resources are written in a continuous MIME data stream and are sent to the print server in packets, enabling high volume transactional output (HVTO).



Previous format conversions are eliminated in a typical PDF/VT workflow

PDF/VT Applications

PDF/VT will be an elementary prerequisite everywhere that true hybrid workflows are applied and printing registers are drawn up with personalized content. PDF/VT will actually support all printing jobs, independent of whether or not they contain variable data.
VDP applications are used in a wide variety of publishing contexts, the most important of which are:

- **Business correspondence:** Name and address of the receiver as well as other selected product information are integrated into personalized letters.
- **Individual publication:** Specific content is prepared for newsletters and newspapers, or incorporated into templates and published directly.
- **One-to-one marketing:** Graphic elements and variable text components are individually selected for each receiver based on simple rules.
- **Multi-channel marketing:** Multi-channel campaigns connect text, image and graphic elements that are tailored for each addressee. The selection is defined by rules, taking into account criteria like demographic factors and purchasing patterns.
- **Transpromotion:** With this type of business correspondence, individual content in transaction documents (for example account statements or invoices with name, address and account number) is supplemented with customer-oriented advertising. This is prepared in a superior graphic format, as is customary with advertising documents.

Further attractive uses for employing elaborate personalized and graphic content are imaginable. PDF/VT offers interesting new possibilities for individualized communication over email or mobile devices like smart-phones with personalized URLs.

Status of the PDF/VT Technology

The newly released Acrobat Reader X can display PDF/VT-1 documents (which was also supported by Acrobat 9), however, variable data is not taken into account. Many well-known Adobe partners have publicly announced their intentions to develop and launch PDF/VT solutions in the form of plug-ins for Adobe products like Acrobat, InDesign etc. And in the fall of 2010, Adobe released to their partners the newest version of their PDF Print Engine (APPE 2.5), which supports PDF/VT.
Independent suppliers are also supporting PDF/VT, for example PDFlib GmbH in Munich has already released a PDFlib 8 VT edition of their legendary developer library, and PDF Tools AG will be offering components for the processing, display and conversion of PDF/VT files.
Several other software producers have openly announced that they will support PDF/VT within the next half year. PDF/VT is for them just one more data stream, similar to the currently known ones like PostScript, AFP and PCL, that they can easily integrate into their solutions.

The first end-user tools will probably become available later this year. And it is expected to see concrete PDF/VT solutions on display at the printing branches' Drupa 2012 exposition.

A Look into the Future

The demand for PDF/VT format is not very widespread at the present time. As with the change from PostScript to PDF technology, it will take a while before the new technology establishes itself in the market. The availability of appropriate tools for creating, processing, verifying, displaying and printing PDF/VT documents are necessary in order for PDF/VT to be a success. In addition, the end-customers who will use this technology will have to develop their own knowledge of it.
The first comprehensive PDF/VT solution can be expected this year. However, it will probably take 2 to 3 years before they are implemented for business critical applications.
There are also critical voices in the market: several leading suppliers of output management solutions have indicated their disappointment that complementary formats like JDF will still be necessary in PDF/VT workflows. And streaming with MIME packets still has room for improvement.

But despite the critic: The file format PDF/VT (ISO 16612-2) will play a key role in the use of VDP applications in the future. PDF/VT facilitates the inexpensive and easy realization of VDP solutions. Order control and production quality will be notably increased thanks to the integrated support of metadata offered in PDF/VT. In addition, data protection for sensitive printing orders can be increased if required through the external storage of metadata.
Based on the widely distributed and accepted PDF/X format, the PDF/VT standard format for VDP workflows will establish itself in transactional and trans-promotional print queues. VDP processes will now benefit from the well-known advantages of PDF, like blind exchange, preview, preflight, transparency, device independence and calibrated color rendering. Parties involved in VDP processes, e.g. marketing experts, designers, prepress specialists and printing shops, will be able to easily and safely exchange, verify and process PDF/VT documents.

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