

# PDF and JDF –

## The Second Generation

Bundesverband  
Druck + Medien  
DEUTSCHLAND



The specifications for PDF and CIP4 JDF have recently experienced their first major version stage. The new formats for PDF 2.0 and CIP4 XJDF (JDF 2.x) enable a wealth of innovative applications related to document exchange and workflow automation. Two current bvdm white papers show what potential the new standards hold for the industry.

The German Printing and Media Industries Federation ([bvdm](#)) has always been committed to up-to-date and user-friendly norms and standards. Without such regulations, automated and networked print production based on the division of labor would be uneconomical, or unobtainable. The Technology + Research department of BVDM provides comprehensive information on this topic on the federation's website, including an annotated overview of selected DIN and ISO standards. In addition, the bvdm guidelines and, more recently, the two white papers are a result of this department.

After the PDF and JDF format specifications were upgraded to PDF 2.0 and XJDF 2.x respectively, including Print-Talk 2.x, PDF sub-standards based on them were further developed (including PDF/X-6, PDF/VT-3 and PDF/A-4) and new XJDF interface specifications (ICS) were created. Based on the current state of the art, the white papers provide an extensive overview of what the new functions of these updated specifications consist of, and what advantages they bring. This will eventually result in various application scenarios and use-cases once they have been implemented by software developers and interface programmers. BVDM and CIP4 provide practical tips, tables, glossaries and link directories, including developer tools and test platforms. These are valuable resources developed to facilitate readers, and to familiarize themselves in detail with the necessary prerequisites required to apply capabilities included in the new standards as rapidly as possible.

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### Numerous improvements in PDF and for PDF/X

The bvdm white paper "[PDF 2.0 and PDF/X-6 — What do the new PDF standards achieve?](#)" (only in German language) focuses primarily on PDF/X-6 (ISO 15930-9), the new standard for print data exchange. It is based on the 2020 PDF specification, PDF 2.0 (ISO 32000-2), and will gradually replace PDF/X-1a, -3 and -4 as the PDF standard for professional printing.

Unfortunately, there are currently no application programs that can generate PDF 2.0. Nor are page design programs such as Adobe InDesign yet prepared to process PDF 2.0 and export PDF/X-6. However, the current Adobe PDF Print Engine v.6 and a few non-Adobe solutions for preflight checking (calas pdfToolbox), workflow organisation (OneVision Asura) and digital proof output (gmg ColorProof with OpenColor) are already able to use the features of PDF 2.0 and PDF/X-6 so that they can process corresponding documents as soon as they are available.

### Adobe in duty with PDF 2.0

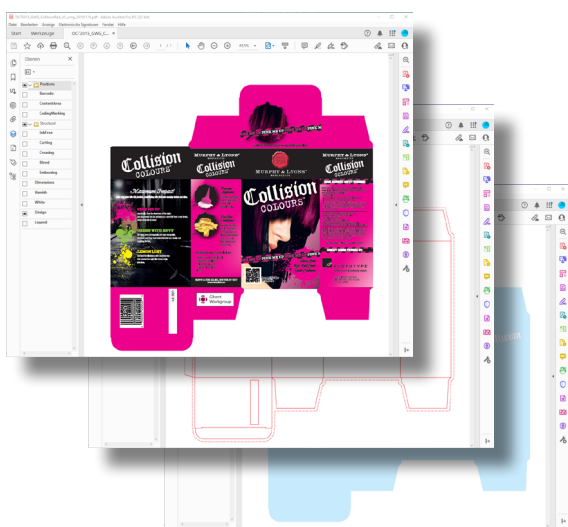
At the last ISO meeting (London, in mid-April 2023), Adobe representatives were still unable to elicit when the Creative Cloud programs will be able to generate PDF 2.0. In the meantime, an [errata](#) exists at the PDF Association (PDFa.org), which was created for the worldwide collaborative cleaning up of errors in the PDF 2.0 specification, which comprises over 1000 pages. This will also have a minor impact on PDF/X-6. This is one possibility as to why Adobe is waiting to implement it.

Since April of 2023, the PDF 2.0 ISO standard, which was originally chargeable, has been [downloadable free of charge](#) through sponsors. This is normally the case with format specifications, unlike all other ISO standards.

# More flexible handling of color management and layers in PDF/X-6

When the time comes, users will benefit in many ways. For example, multiple output profiles can be used in a single PDF/X-6 document if different printing processes and/or substrates are used in print production. PDF color management now also supports black point compensation, spectral color values and multi-channel ICC profiles (n-Color).

Folding carton printers can finally define all contour and area-related finishing steps up to Braille in a standardized way, the OCG layers ("Optional Content Groups"). There are also improvements in the inte-



Screenshots of a sample file with folding box subject and its standardised OCG processing layers "InkFree", "Cutting", "Creasing", "Bleed", and "Embossing" as well as an opaque white layer. Further layers are reserved for position and dimension information, varnish and a legend.

(Source: Processing Steps, GWG.org)

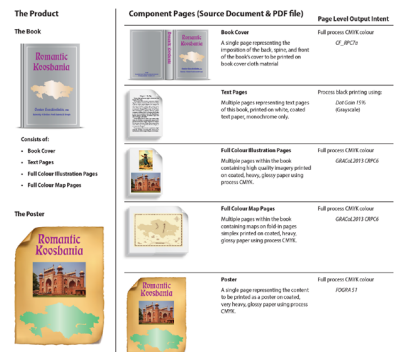
gration of metadata for workflow automation – also with a reference to XJDF — and in the cross-media use of PDF documents.

# More consistency between PDF sub-standards

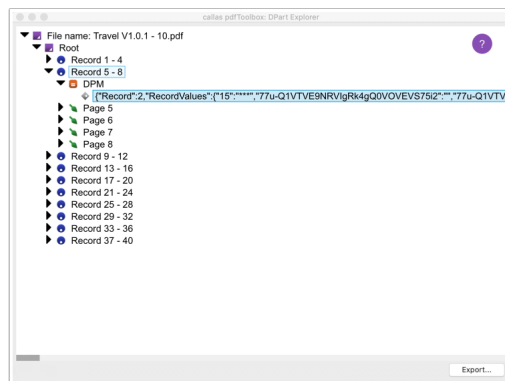
In this respect, a PDF/X-6 file always also fulfils essential requirements in PDF sub-standards for archiving according to PDF/A-4, and for digital printing according to PDF/VT-3. One reason for the new cross-compatibility between the derived standards is that many functions from the earlier sub-standards have now been incorporated into the basic PDF 2.0 specification.

The "Page-Level Output Intent" (page-related output intent as a prerequisite for several ICC profiles

in composite print-job documents), "DPart" (hierarchically structured metadata in "Document Parts", formerly developed for digital printing) and "Tagged PDF" (use of style sheet tags, among other things, as a prerequisite for barrier-free document exchange) should be emphasized. In-addition, as PDF 2.0 also understands itself as "Rich Media PDF", audio and video files can be reliably integrated into the docu-

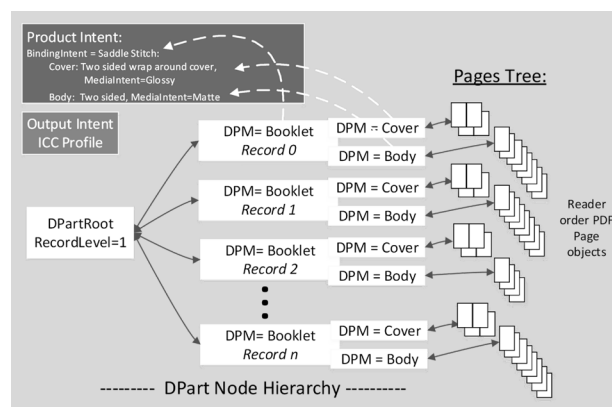


Example of the application of Page-Level Output Intents in PDF/X-6. (Source: Dov Isaacs, Adobe Systems, for the Ghent Work Group).



In the callas pdfToolbox, the DPart Explorer or pdfDPartner is the only viewer for DPart metadata available to date. With this, the metadata can also be extracted from the PDF/X-6 file.

(Source: callassoftware.com)



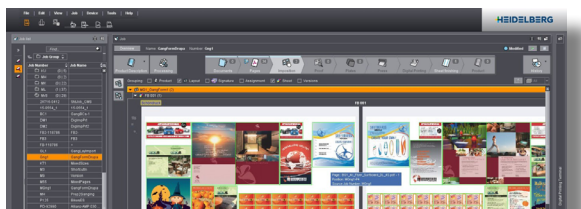
DPart method as originally developed for PDF/VT, using the example of booklet digital printing. The metadata for the booklet document parts (DPM) "cover" and "inner" part are linked with the DPart pages to form a common page tree.

(Source: PDF/VT Application Notes, PDF/A.org)

ment. In the interest of overall compatibility, these file types and commentary content are no longer necessarily forbidden to include in PDF/X print files, provided that a printable or non-disturbing form of presentation is agreed upon.

## XJDF leads to more flexibility in automation and networking

The other bvdm white paper, “[XJDF — Building Blocks for the ‘Printing Industry 4.0’](#)”, provides information on the [XJDF standard](#), which the “International Cooperation for the Integration of Processes in Prepress, Press and Postpress” (CIP4). The goal of this white paper is to establish XJDF as the successor to the previous JDF job ticket. XJDF allows for far more flexibility in process automation and networking. The “Job Definition Format” had led to a dead-end in many respects, which was the reason to begin development of JDFX. Because of its widespread use however, [JDF 1.x](#) will continue to be maintained, in



Heidelberg has already implemented XJDF in its Prinect software. Gang and nest forms are visualised in the Prepress Manager cockpit as a result of the AI component Gang Assistant.

(Screenshot: Heidelberger Druckmaschinen AG)

parallel with the upgrade to JDF 2.x. JDF 2.x will, as a result, henceforth be communicated as XJDF 2.x (“Exchange JDF”) in accordance with the paradigm-shift achieved with it.

In principle, nothing will change for the end-users. The elegance and benefit to using XJDF means that the application and interface programmers at the providers of MIS, web-shop and quality management software; as well as machines and devices are responsible for the step-by-step compliant implementation via updates or firmware. XJDF is backwards compatible with JDF, so that the significantly expanded possibilities can be programmed mostly without excessive effort.

## XJDF should also eliminate the issue of “JDF networking islands”

XJDF improves the digital communication of order and production data through its lean and flexible data structure. “Lean” means that the XJDF product descriptions dispense with redundant information in the various process stages and exclude proprietary data structures. In this way, the new standard overcomes the vendor-specific “networking islands” often criticized in its predecessor JDF, thus finally realizing the interoperability that was the original goal that JDF was designed to achieve. In other words, processes and components can now work together across diverse manufacturers and software developers. “Flexible” means that XJDF is evolving from a rigid job-ticket model to a simple, expandable exchange format in which even several products can be combined and versioned into one job or several jobs in a collective form.

A special focus of XJDF is upon interconnectivity with web-to-print shops and between companies or sites via MIS and ERP applications. The basis is well-formed, validated XML, which enables easy implementation with common programming styles in a wide variety of solutions as well as in existing software. Thus, XJDF is at the same time a universal counter-design to interface programming solutions with proprietary REST APIs — including the growing Zaikio communication platform. This also benefits the connected hardware, which is able to use XJDF and its real-time messaging format XJMF for permanent process control.

In addition, the translation of XJDF/XJMF to JSON (JavaScript Object Notation), which is now available, allows all processes to be displayed and controlled on mobile devices. At the same time, this should encourage younger developers who have long-since stopped programming in XML, and prefer the more modern methods of JSON development.

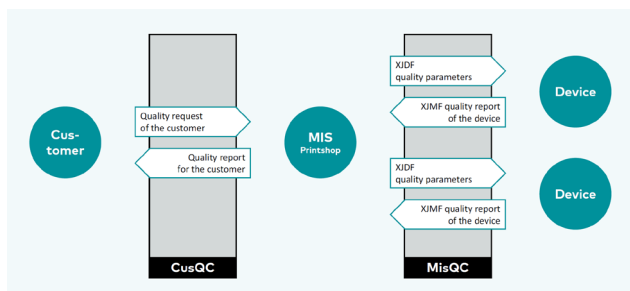
## XJDF ingredient list and ICS cookbook

The two new XJDF interface specifications, which are designed as “Interoperability Conformance Specifications” (ICS), take up a larger space in the white paper. In contrast to the XJDF format specification as a whole, the “list of ingredients” in the the ICS documents embody the “recipes” for the developers of software and hardware networking solutions. With

XJDF and the ICSs, the vision of the “printing industry 4.0” can become a reality — from integrated customer and supplier processes, to all production processes, partly by using artificial intelligence, for example in the automated real-time generation of collect forms.

## Highly automated online print purchasing

The Customer to Automated Print Procurement ICS (Cus-APP) was developed (as its name implies) for the benefit of automated print procurement in workflows. In addition to XJDF, it also accesses the [PrintTalk 2](#) “ingredient list”. This ICS is designed to be used to program web-shop workflows that create a job tick-



Interaction of the interface specifications “Customer to Quality Control ICS” (CusQC) and “MIS to Quality Control Device ICS” (MisQC).

et at the customer interface from the print product parameters. The resulting XJDF ticket can then calculate quotations and final prices, as well as maintain the ability to automate, and integrate the commercial processes (transactions) that are ultimately handled via the print shop MIS.

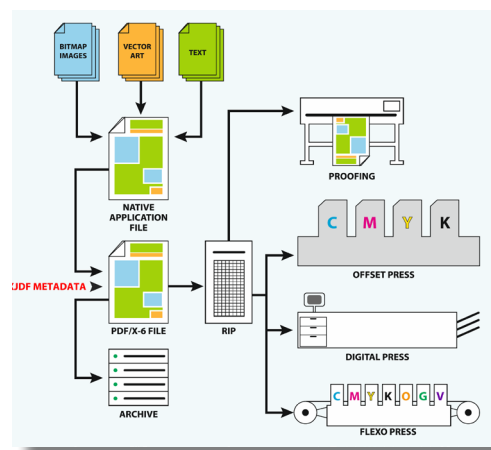
## Quality management in real-time, and with more detailed data

JDF print quality specifications and job-quality data determined during production processes can now also be transmitted in real-time. The two-part “XJDF Quality Control ICS” (CusQC + MisQC) was created for this purpose. The CIP4 ICS developers placed particular emphasis on making it easier for printers to dovetail their processes with those of their partners and customers.

With the help of the “Customer to Quality Control ICS” (CusQC); processes implemented in the web shop, and subsequently mapped in the MIS, the print buyer can define quality targets. In contrast, the “MIS to Quality Control Device ICS” (MisQC) implements the processes for the bi-directional exchange of target data, and actual quality data between the MIS or ERP,

and the production systems with their largely in-line installed measuring devices and sensors. It is here where the solution providers are most in demand.

The concerns occasionally expressed about a “transparent print shop” that makes a print service provider more susceptible to complaints become unrealistic. Initially, due to the MisQC implementation in XJDF/XJMF, the printer gains a previously unattainable



XJDF meets PDF/X-6: Embedding XJDF metadata in the PDF/X-6 workflow.

(Source: PDF/X-6 Application Notes, supplemented by the input “XJDF Metadata”)

real-time control over its quality production and can react more flexibly to unexpected problems. What they pass on to the customer via CusQC implementations is entirely up to them. Furthermore, at this high level of automation, the former aversion to measuring technology in the feeling of being observed by some machine operators, is a thing of the past.

Also, a further ICS was released: the Management Information System ICS (MIS ICS). It standardises the base communication between the production devices (“Workers”) and the printing MIS (“Manager”) which is responsible for manufacturing planning, monitoring and execution of the print production process.

## A good piece of advice in conclusion

The printing industry can only benefit from PDF/X-6 and XJDF development, but this requires that the printing industry works to implement these solutions from the suppliers. To facilitate this, it can be extremely usefully to approach the suppliers of the solutions used in-house to request XJDF tools. The more the users’ needs become apparent, the sooner the new standards are likely to arrive in practice.

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