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# Integrated Workflow in the New Business of Printing™

## **The FreeFlow Digital Workflow Advantage**

Prepared by INTERQUEST, Ltd.



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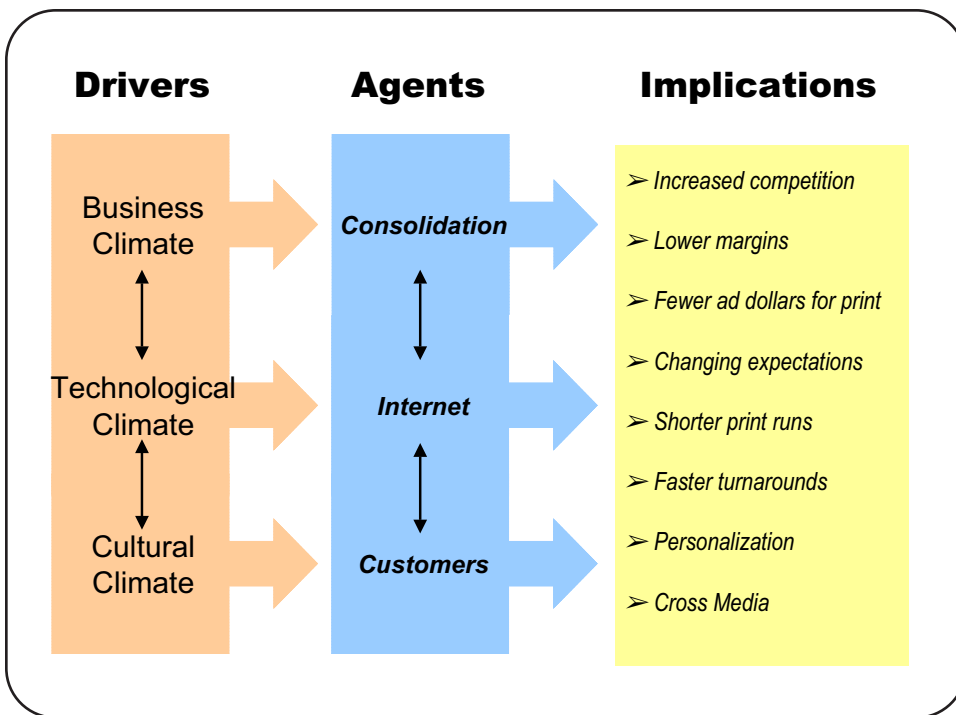
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# Introduction

**P**rinters today are challenged by a fierce competitive climate, the impact of electronic media, and changing customer needs and expectations.

Workflow is central to meeting these challenges, not only because workflow automation drives efficiencies, but because workflow can be extended out to customers and suppliers, enabling closer more enduring relationships.



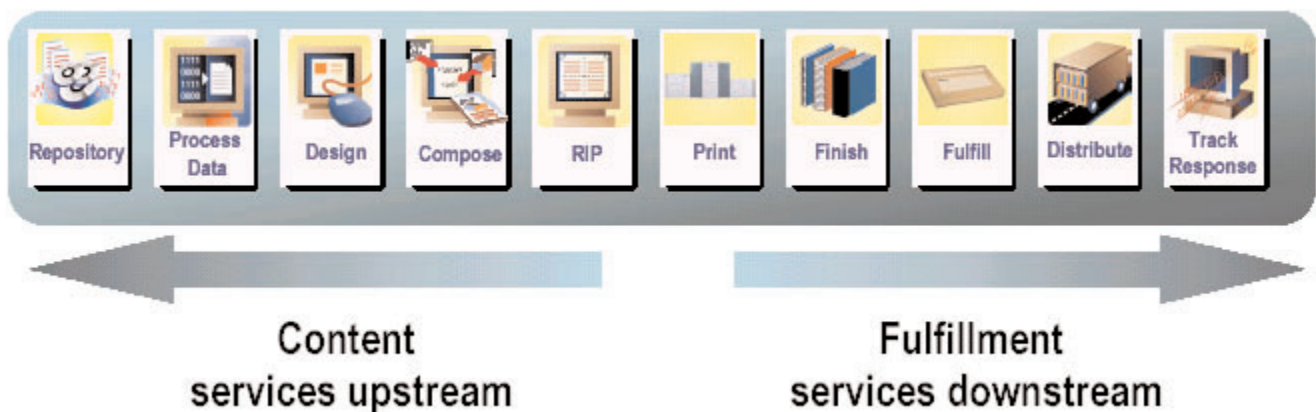
Changing customer expectations and needs has forced many printers to reposition, refine, or fundamentally alter their services. Doing so dictates a serious reexamination of workflow. In evaluating workflow solutions, printers should detail their specific requirements and ask the following questions:

- ♦ *Will the workflow investment support a business growing into full-color digital printing?*

INTRODUCTION

*In fully open and integrated systems, all components are able to continually communicate and interact with one another*

- ♦ Are workflow products fully integrated?
- ♦ How many discreet products will be required to support end-to-end production, including the design, preparation, printing, and fulfillment of a job?
- ♦ Does the workflow support flexible file formats which facilitate editing and storage?
- ♦ Does the workflow provide a framework to support all required application environments, such as on-demand publishing and transactional processing?
- ♦ Can the workflow integrate with existing production processes, such as digital and offset printing to avoid parallel, redundant tools and processes?
- ♦ Can the workflow integrate with other technologies and systems to provide a complete end-to-end architecture to support the business?



*FreeFlow components and partner products enable providers to build complete end-to-workflows which encompass the entire value chain, from customer interaction to data and asset management and on through file preparation for print and electronic media, fulfillment, and distribution.*

## One Workflow for Monochrome, Highlight, & Full-Color Production Printing

One of the key objectives of FreeFlow is to provide a workflow framework for *all* digital printing applications in order to automate operations and integrate digital printing into business, management, and production processes. Unlike solutions focused primarily on one output environment such as monochrome digital printing, FreeFlow spans black-and-white, highlight, and full-color devices. This reduces the time and expense required to migrate to other output environments and digital applications.

## RDO & PDF—Best of Both Worlds

PDF is an ideal final-form format for automated prepress workflows due to its inherent stability and compactness. Xerox RDO (Raster Document Object) files, supported by FreeFlow Makeready, is a complementary file format which provides equally critical functionality not available and not intended to be provided by PDF.

RDO files can access job ticketing information and add new instructions for compound jobs with multi-page objects. These editable files can then easily be converted to a portable format such as PDF, as well as other formats such as PostScript, EPS, and TIFF. The integration of JDF (Job Definition Format) and PDF into FreeFlow provides a simple process for conversion.

*Workflow should function like the plumbing or electrical system in a shop as a persistent and necessary feature that enables and adds value to operations, and can be modified and extended without a major reinvestment in the basic infrastructure.*

*Xerox RDO is based on ODA (Open Document Architecture), ISO standard 8613. FreeFlow supports a variety of other open interfaces and standards such as JDF, IPP (Internet Printing Protocol), PDF, and XML.*

INTRODUCTION

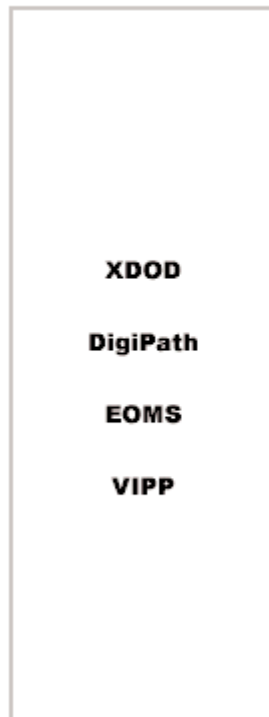
## Technology Extensions & Services

Xerox is currently working with more than 100 business partners. Twenty-five partners now offer 31 products which are officially “optimized” for FreeFlow. These best-of-breed partner technologies extend the FreeFlow offering and ensure the most efficient and affordable solution for all types of jobs and applications.

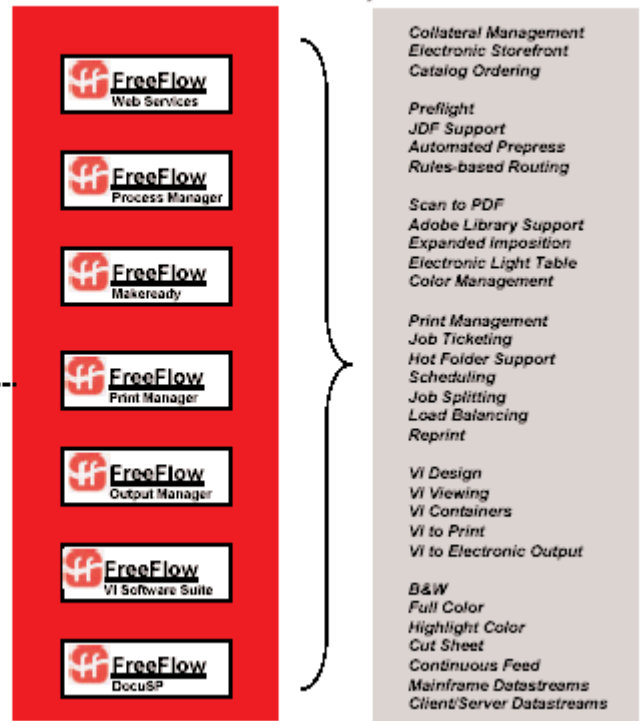
In addition to these offerings, professional services are available for workflow assessment, systems integration, application programming support, and business development. The combination of standards, modular components, optimized partner products, and services provides the flexibility needed to address the diverse VI workflow requirements of print providers, including service bureaus, commercial and quick printers, and corporate in-house operations across a full range of monochrome, highlight, and full-color cut-sheet and continuous-feed equipment.

*Some of the capabilities of FreeFlow can be traced to legacy products such as XDOD, DigiPath, EOMS, and VIPP, but it is far more than the sum of earlier products in design, scope, and functionality. In some cases, aspects of earlier products were incorporated into FreeFlow, but only after being extensively reengineered so as to be fully integrated into the FreeFlow architecture. Xerox VIPP, for instance, continues to be refined, enhanced, and extended to meet the changing requirements of the market.*

### Legacy Products



### One Architecture, New Products, Enhanced Capabilities



# FreeFlow Benefits

## Connecting with Customers

### *Comprehensive Web Solutions*

Although the Internet has impacted the graphic arts industry in many indirect ways, it has also proven to be a powerful enabling technology. First and foremost, the Internet is a common gateway and meeting ground for printers and their customers. It enables printers to forge more enduring ties in two ways: by closely tying the service provider to the workflow and business processes of the customer, and by actively involving the customer in the workflow of the printer.

Unlike products which target a specific market segment or application, FreeFlow provides a complete portfolio of Web-driven solutions. For static, versioned, and personalized documents, FreeFlow Web Services provides an affordable e-commerce site where documents can be ordered, uploaded, processed, and printed. It is fully integrated with FreeFlow Process Manager for an automated, end-to-end solution.

For providers looking for a more robust custom storefront solution, XMPie uStore provides a comprehensive e-commerce site with user editable text and production integration with Xerox presses. The combination of FreeFlow Print Manager or FreeFlow Output Manager—along with JDF—enable highly efficient, cost-effective order-to-production print workflows.

FreeFlow Web Services and XMPie both leverage the Web to make it easier for customers to order jobs with static, versioned, personalized, and 1-to-1 cross-media content. Digital storefronts make the ordering process painless and convenient for customers, and enable printers to begin automating their operations as far upstream as possible. Standards such as JDF, along with common interfaces and protocols integrate downstream FreeFlow components with the Web-based customer interface.



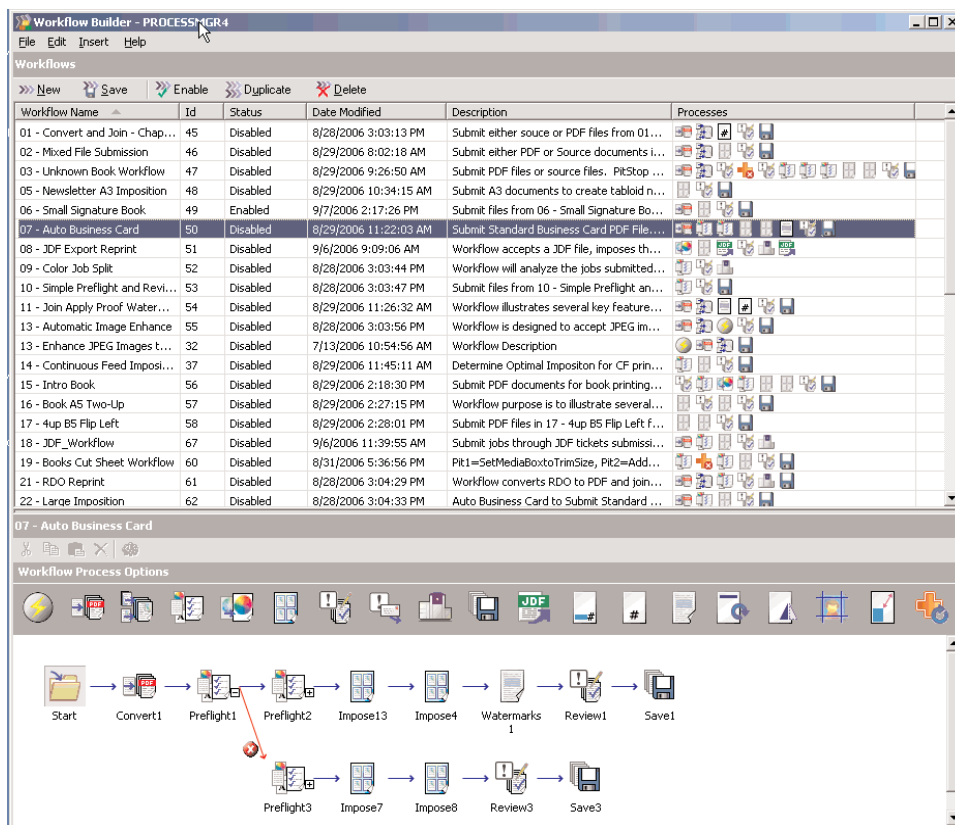
## FREEFLOW BENEFITS

### Reducing Costs

Print manufacturing is a linear process and bottlenecks in an operation disrupt the flow of work while leaving resources idle. Manual intervention and incompatibility between software and equipment lead to errors, repeat work, waste, and downtime. FreeFlow offers cost-saving business, process, and output management tools to enable printers to turn more jobs in less time and in a more cost efficient manner.

### FreeFlow Process Manager—Automating for Higher Profits

Automating processes keeps costs at a minimum and maximizes profit on print jobs. FreeFlow Process Manager enables fully-automated, JDF-driven prepress workflows with interfaces to external programs as well as other FreeFlow components.



## FREEFLOW BENEFITS

With FreeFlow Process Manager, sequential tasks such as preflighting, color management, imposition, and proofing can be automatically executed on incoming work and jobs routed to the next production step based on the results of the prior operation.

Customer-supplied image applications such as photobooks and yearbooks often require printers to work with images which can vary in quality and format. Xerox Automatic Image Enhancement (AIE)—unique to FreeFlow—automatically manipulates RGB or grey scale images in .jpg, EPS, and .bmp files, or images within PostScript and PDF files prior to conversion to CMYK. AIE evaluates images in a job, preserving good-quality images and improving imperfect ones. AIE can be implemented within Process Manager or directly on the DocuSP controller.

### ***Print Management for ALL Production Processes***

Once a job has been prepared for print, FreeFlow Print Manager and Output Manager manage printers, queues, and jobs using a variety of job submission options, including JDF. Improved job ticketing, including automatic capability matching of incoming work with available printers, increases the efficiency of operators and results in fewer printing errors. FreeFlow Output Manager automatically schedules work and distributes jobs across a pool of digital printers based on the requirements of a production operation. Incoming work is analyzed with scripts to determine the length and content of jobs which are then split and distributed in the most efficient manner.

Unique to Xerox is the ability to integrate an offset prepress environment with Xerox digital presses to create one workflow which supports digital and conventional production. FreeFlow Print Manager enables digital operations to be integrated with traditional prepress systems such as Heidelberg Prinect Pretrready, Creo Prinergy, or any JDF-enabled offset software program, preserving prior investments in software and training.

*AIE is ideal for imperfect images from amateur photographers as well as images clipped from Web pages or compressed in emails*

*Printers are increasingly realizing a competitive advantage in offering mixed offset and digital printing services*

## FREEFLOW BENEFITS

### **One Controller/One Interface for Monochrome & Color**

DocuSP—the common controller for all of Xerox’s production printers—establishes two-way communications between printers and upstream workflow components. One interface for all printers presents operators a consistent tool set and minimizes training if new printers are added.

The FreeFlow DocuSP controller provides native support for IPDS (including color), LCDS, HP PCL, Optimized PostScript and PDF, VIPP, ASCII, TIFF, and PPML. Page- and job-level parallel processing analyzes incoming files and automatically allocates pages across available interpreters. The controller maps entire jobs, using the hard drive as well as pure memory to store fully rendered objects for highly efficient image caching.

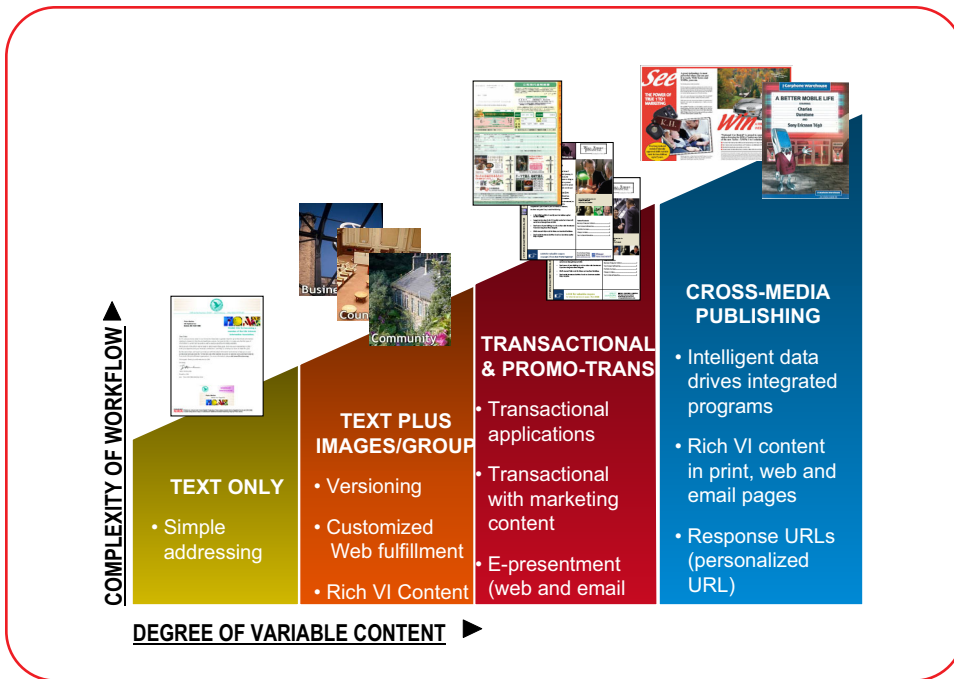
### **Enabling New Applications Across Multiple Environments**

Customers are increasingly turning to print service providers for a broader range of communications needs, including digital color, personalization, and cross-media campaigns. As a result, many printers are providing an increasingly diverse and complex gamut of services. FreeFlow is designed to be sufficiently flexible and extensible to serve the full range of digital services from one common framework.

As opposed to workflow solutions that are primarily intended for a single type of application such as transactional, mainframe-driven documents, FreeFlow provides a framework for designing and supporting applications in both transactional and publishing environments, including cross-media campaigns.

*Consolidation is occurring in many forms in the industry. INTERQUEST finds that nearly half of the corporations it surveys have consolidated their publishing and IT printing environments. At the same time, third-party providers are adopting applications at one time considered the domain of specialty service bureaus.*

**Publishing- & Transaction-Based Direct Mail**



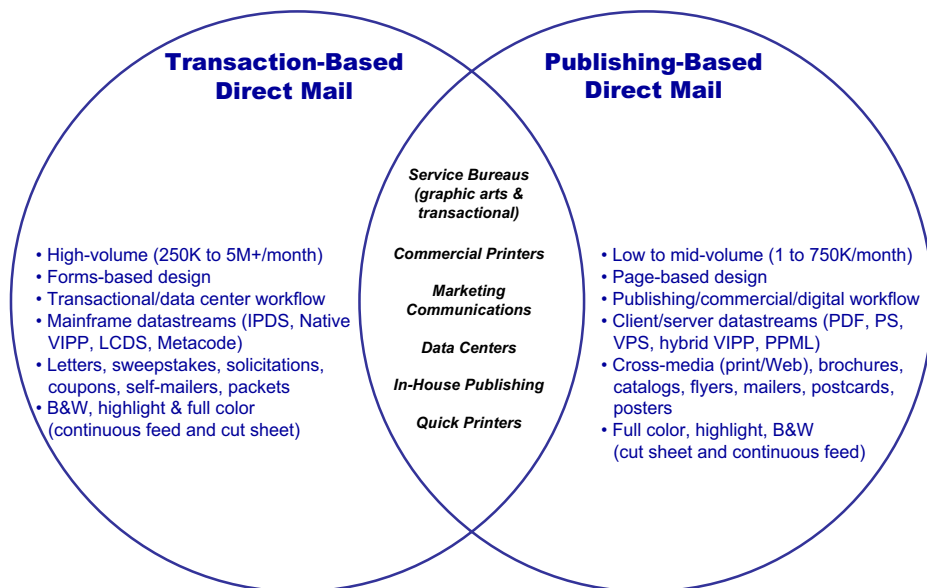
*VI applications form a continuum of workflows which increase in complexity as the degree of variable content increases. Cross-Media publishing is the pinnacle, demanding a high degree of coordination & expertise, but delivering the most value.*

Direct mail rises to the top of the applications generating the most digital print volume among respondents to INTERQUEST surveys. It is a broad application category which increasingly encompasses very high volume, transactional-oriented production, as well as personalized publishing and cross-media campaigns which blend print with customized Web landing pages (personal URLs), e-mail, and telemarketing.

A variety of 1-to-1 cross media publishing workflows ranging from the straightforward to the complex can be configured with FreeFlow. XMPie uPlan™ can be used to establish business rules for driving database-driven campaigns. XMPie plug-ins are available for Adobe InDesign® CS2, GoLive™, and Macromedia Dreamweaver™, turning familiar creative environments into powerful variable data design tools. Response web sites can be automatically generated and deployed with XMPie uProduce™, and the additional information gathered there used to further refine and extend a campaign.

*FREEFLOW BENEFITS*

**Direct Mail Environments**



*The FreeFlow architecture addresses both transactional as well as publishing direct mail applications, enabling providers to expand their services using one set of workflow across all production printers*

A key advantage of FreeFlow for direct mail applications is that in addition to direct mail publishing applications, which typically use PostScript- and PDF-based workflows, the FreeFlow framework equally supports transactional-based direct mail. Traditional high-volume direct mail applications are enabled with VIPP and IPDS. The FreeFlow DocuSP controllers support an extremely lean and efficient native-mode VIPP workflow which caches all static job elements on the controller. Raw data is sent to the controller and the pages assembled on-the-fly at the controller at the full speed of the printer. DocuSP controllers can also process native IPDS files.

## FREEFLOW BENEFITS

The DocuSP controller is equally effective for monochrome, highlight color, and full-color production, and accepts static and variable print streams from virtually all platforms and operating environments. VI printing developed in a highly specialized niche, and many products and vendors remain compartmentalized on one particular environment or application. VI printing is moving mainstream, however, and Xerox equipment is used in all VI environments. FreeFlow provides flexible workflows and support for a variety of VI formats, including VIPP, VPS, Optimized PostScript and PDF, and PPML, as well as more traditional variable information output formats such as IPDS. In addition to native support for VI formats, the DocuSP controller interprets portable, transportable VI Container files for VIPP and other formats such as PPML.

### ***Full-Color Promotional/Transactional Statements***

Although transactional statements and invoices continue to be printed in monochrome and highlight color, more and more companies are discovering the hidden power of linking promotional content to transactional data in single-pass full-color documents. According to INTERQUEST surveys, full-color promotional/transactional printing is viewed as a key opportunity by print providers and is steadily gaining volume. As with transaction-based direct mail, FreeFlow provides a flexible and extensible architecture for designing and producing promotional/transactional documents.

Promotional/transactional communications blend the data-intensive mainframe world with PostScript-based printing, introducing requirements for richer, color-intensive pages. The FreeFlow VI Suite assists customers in migrating from traditional transactional output to a PostScript workflow. Because VIPP is able to process line data, the mainframe applications used to generate it do not have to be modified. Tools from FreeFlow partners such as Lytrod are available to convert LCDS resources into PostScript format.

*Although black-and-white transactional printing is expected to slightly decline over the next three years, INTERQUEST expects full-color transactional print volume to increase by 39% per year*

## FREEFLOW BENEFITS

*Native support for a data-stream is far more efficient & reliable than transforms, which add another layer of complexity & processing*

For promotional/transactional workflows based on mainframe formats, the FreeFlow DocuSP controller provides native support for IPDS (including color IPDS), the device-dependent AFP print stream. Xerox is also an active participant in the AFP Color Consortium. LCDS Spectrum gives customers the ability to print LCDS in either highlight or full color.

### ***Collaterals & eCommerce: Building an Ideal Engine for Print***

Web-to-Print is a natural evolution of on-demand printing, and is often used to manage collaterals which incorporate static, versioned, and variable data content. FreeFlow Web Services, powered by Press-sense, is designed for printers to easily implement an electronic storefront to drive collateral management programs. Catalog reordering enables a printer to host libraries of documents and create customizable templates. Business rules can be set up to drive unique workflows for each customer.

Jobs received through Web Services can be sent directly to a print engine, or routed to other workflow products such as Makeready, Process Manager, or Output Manager. It is able to transfer all job ticketing instructions to the print engine, or to send JDF instructions to other workflow components.

### ***Digital Book Production—Workflow for a Profitable Business Model***

INTERQUEST forecasts that digital book manufacturing will grow at a compound annual rate of about 26% over the next five years. Digital production of manuals—already a well-established application—will continue growing as well, and will increasingly contain color and variable content. The fastest growing applications include trade and professional books, and educational materials such as coursepacks.

## FREEFLOW BENEFITS

An appreciable percentage of the book pages produced on digital equipment originates with hard copy. The FreeFlow Scanner 665 scans directly to PDF and makes images available immediately for additional operations. Image de-skewing and the automatic segmentation of pages into text, graphics, and images is done on the fly at full speed.

For coursepacks and educational publishing the Copyright Management option for FreeFlow Makeready—available in the U.S.—provides a programmatic interface to Copyright Clearance Center (CCC), a non-profit clearinghouse that works directly with copyright holders and higher education users. The Book Assembly option of Web Services enables customers to build customized books and binders from content they upload to the provider's site. Users are given an accurate rendition of their job when the building process is complete.

Digital book manufacturing is often carried out on a combination of high-speed continuous-feed monochrome equipment for book blocks, and full-color cut-sheet equipment for covers and inserts. FreeFlow Makeready offers common setup and alignment tools for both categories of equipment. The FreeFlow DocuSP controller drives all categories of Xerox production equipment, presenting a common user interface for operators.

Process Manager MAX (Manifest Automation from Xerox) can be used to create a Bill of Materials based on line items in a customer's .csv file. This provides a convenient interface to legacy systems or customer programs which may not yet emit JDF. The Bill of Materials can be printed on a production or desktop printer with barcodes and instructions for finishing, packaging, or fulfillment operations.

*Copyright Management enables operators to assemble coursepacks from electronic files or scans, obtain copyright clearance, check the status of copyright holders, and price the offering based on production and copyright costs.*

# Conclusions

**X**erox believes that for print providers to survive and thrive in the “new business of printing,” they must choose a business model which is both profitable and growing, and support it with the right workflow and production technologies. FreeFlow enables print providers to assemble end-to-end workflows from modular hardware and software components which share open standards and public interfaces. It automates administrative as well as production processes, and provides a foundation for building a variety of applications and services without sacrificing investments in training and software.

Digital printing is rapidly merging with conventional print production. At the same time, the printing industry in general is being affected by other communications media such as the Internet. The confluence of these trends places enormous pressure on print providers to rethink and retool their internal operations as well as their business models and relationships. And while some may not view these as workflow challenges, they are exactly that. Xerox approaches these challenges by offering a flexible workflow framework based on open standards and interfaces. FreeFlow is a recognition of and a response to the changing business of printing. It allows printers to optimize and expand their services, while building closer ties to their customers.

*Modular workflow products from Xerox and third-party FreeFlow partners enable print providers to construct cost-effective automated end-to-end workflows for the full range of digital applications.*



Connect with your customers  
Automate and reduce costs  
Enable new applications

Open Architecture  
Industry Standards



Leading edge  
Xerox products

Web Services, Process Manager, Output Manager,  
Print Manager, Makeready, VI Suite, DocuSP

Integration with  
strategic partners





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