

Challenges and Opportunities in Web-To-Print Workflow for Production Digital Printing

Chuck Gehman; Mimeo.Com; New York, New York/USA

Abstract

Production workflow for digital printing is rapidly evolving, driven by the marketplace and customer demands. The need for service providers to efficiently handle an increasing volume of jobs drives adoption of automation technologies.

Applications for digital production printing continue to grow: from traditional monochrome statement printing to “offset replacement” for certain high-end commercial print jobs, to personalized print for direct mail, and to “transpromo”. Each new application, as well as the business needs of the customer from which it originates, creates the demand for a specialized workflow. To be efficient, those demands must be aggregated into standardized workflows that allow service providers to benefit from automation.

Customers represent the beginning of a workflow. Today, their jobs may come from a Web 2.0 “social network” system (i.e., photo sharing), or from a Web-To-Print application, or from a corporate CRM or ERP system. The input from these disparate sources must be “normalized” into a standard format for print manufacturing.

This paper will provide an enumeration of several good approaches, techniques and technologies for automating the production process from the desktop or network of the document owner through to the final delivered product, by employing digital printing and production workflow systems.

Introduction

Print Production Workflow has long been as much an art as a science. Document creators have the choice of a plethora of applications to use to build documents. The speed at which new applications are introduced is increasing.

- Corporate systems seem to be generating an accelerating amount of data that needs to be printed.
- With the continued global growth of the Internet, there are now a host of additional sources of content; much of which is actually desirable to produce and distribute in printed form.
- In an increasingly global business environment, challenges are introduced by geography (print and distribute/distribute and print), language, culture and currency, as well as paper sizes and weights.
- New output formats and technologies are putting pressure on existing workflow and output systems- Microsoft's XPS format is one major example.
- Workflow is still facing legacy issues like the difficulty of controlling multiple, disparate controllers and their attached machines in a multi-vendor workflow, as well as basic problems like color management, planning and scheduling.

Fortunately, it's not all bad news. Print production workflow has been the beneficiary of many of the biggest technical advances

in technology over the last few years. Dramatic increases in CPU processor power, and the advent of affordable multi-processor (as well as multi-core CPUs) have decreased processing times for even the most complex jobs. Main memory has always been a constraint for graphic arts applications, but now is an issue only for certain applications, like VDP, due to the availability of fast and cheap memory technologies. Storage has similarly become a non-issue for graphic arts production, due to affordable terabyte-scale disks. Finally, relevant to all workflow, and not just Web-To-Print, the availability of cheaply available broadband Internet bandwidth has been a boon for production applications, whether to receive jobs, load-balance between facilities, and for supporting utility applications like downloading software updates, and obtaining or providing training and support.

Defining Web-To-Print

Web-To-Print is e-commerce for the printing business, with both retail and B2B components. It is unique because it includes both content and commerce workflows. If implemented correctly, it represents a way to make printing operations more efficient—both in order negotiation and processing, and in terms of production tasks. For commercial print service providers it is a way to improve top line revenue; for in house printing operations, it helps improve customer service and quality for demanding internal customers.

What makes these benefits possible is to take a holistic, end-to-end approach to workflow for production digital printing.

Merging Content Channels

Content now arrives at the production facility from a wide variety of different sources (channels), both web-based and “traditional.” Each of the sources has a different set of requirements that create challenges in the production environment.

These new channels of job flow each have their own workflow needs, and customers (whether internal or external) with different expectations for how their jobs will be handled and produced.

Desktop Applications

Desktop computer applications have long been a primary source of job flow into production workflow, and this channel continues. Many of the past challenges associated with desktop applications have been mitigated through software innovations.

For example, Adobe InDesign's ubiquity and ability to support PDF generation, has dramatically improved the quality of input into print production from graphics professionals. Web-To-Print workflow directly from desktop applications in Adobe Creative Suite can generate PDF files along with JDF (Job Definition Format) instructions that should be able to power workflow automation at the printing site.

On the other side of the continuum, while it might be generally said that many corporate document creators are justifiably ignorant of the print production process, their ability to deliver usable documents has been improved dramatically by technology. The ability for desktop PC operating systems to easily generate acceptable PDFs has also been of great benefit.

There are a whole new set of challenges looming on the horizon for the desktop, in the form of the emergence of Internet applications running “off line”. The technologies associated with these applications are things like Adobe’s Flash and AIR, Google Gears, and other emerging technologies. The intent of these solution sets is to allow developers to use rich internet applications to be deployed and run on desktop computers. The emerging issue is that the print streams generated by these applications are generally the same as the Internet technologies on which they are based; this more often than not is simply File-Print from within the application, with mixed results.

Corporate Systems

While Storefront-type sites used by either consumers or corporate staffers to obtain print products have become popular, Web-To-Print can also involve integration with enterprise systems, including business, finance and line of business applications. Many printing operations are finding that they need to interface production systems to business systems via EDI (Electronic Data Interchange, a standard method for supporting e-business transactions that predates the Internet), and XML (eXtensible Markup Language, an Internet technology used to support e-business transactions.)

In many companies and institutions today, printing is now “owned” by the IT (Information Technology) group. The same people responsible for the shared workgroup laser printer down the “cube row” may now own the Corporate Reprographics Department (CRD) or “manned print rooms”. It is certain that much of the corporate data that needs to be handled by the printing operation is already managed by IT.

It’s may be easier for IT people to get up to speed on printing technology than it is for printing people to become experts at data handling, especially with advances in printing software and output engines. Transpromo is the current industry buzzword, a combination of “Transactional/Promotional” printing- meaning statement printing that includes advertisements or offerings, and generally includes color and graphics.

Transpromo is only possible with data mining. Most print service providers are not well-versed in the language of data as spoken by corporate IT, let alone how to actually do it. Data sources are highly proprietary, and in many cases secret. It is the rare print service provider who has proven trustworthy and competent enough to work with these corporate assets:

- Purchase and other transaction data.
- ERP (Enterprise Requirements Planning) and CRM (Customer Relationship Management) system data, recording interactions with sales, technical, service, or customer support.
- Live capture from web sites, of leads and product inquiries.
- Event lead capture: from meetings, tradeshow and other marketing events.

Whether the goal is to implement Transpromo or not, companies want to use print to advantage their managers, their

sales people, franchisees, and to support other relationships. As a result, print products need to be timely, specific and personalized to the people that will use them and their intended audience which is tightly targeted by marketing people crunching numbers based on the data they keep in their CRM or other corporate data repositories.

Web Sites

There is an astonishing amount of content resident on the web today. Blogs, Wikis, corporate sites, news media sites and more, all contain content that could be repurposed for print.

- Between 2000 and 2005, Home high speed internet connections increased from about 5 million to over 80 million.
- Internet usage doubled from about 100 hours per year per person to about 200 hours per year.
- E-Commerce Retail sales went from about \$25 billion in 2000 to more than \$80 billion in 2005 [1]

The challenge is that a lot of this data is not formatted to be printed. Even web pages that have been designed with the intention that a user may want to print them, often do not result in well formatted output.

For all the global standards efforts that have been applied to creating the wonderful experience we call the web today, very little effort has been applied to printing the web. Initially, the reason for this is that the creators of the web believed they would replace the primitive print medium. Today, though, it isn’t the tech-geek hubris of the last web generation—it’s just developers are too busy making their online applications function to worry about the adjunct of print.

However, this is a source of content that continues to grow dramatically, and the reason why Web-To-Print is becoming so popular:

- Some 38 million full-time workers in the nation have Internet access at their jobs and two-thirds of them (67%) go online at least once per day. Seventy-two percent of full-time workers with Internet access at work say it has improved their ability to do their jobs.
- A May-June 2005 Pew survey found that 67% of all internet users had bought a product online. A full 45% said the internet played a major role as they made major investment or financial decisions. There can be no doubt that these numbers will greatly increase with their next survey on the topic.[2]
- Over 30 percent of all print is now purchased via web-enabled tools. By the year 2015, adoption of Web-To-Print will triple to 90 percent of commercial printers. [3]

Web 2.0 Applications

Web 2.0 represents a renewed level of excitement around the use of innovative web applications and services. The transition of web sites from isolated information silos to becoming computing platforms serving web applications to users is a key idea. Earlier web applications or “Web 1.0” often consist of static HTML pages, or even dynamic pages driven by content management system generating pages on the fly out of a database. These systems are primitive compared to the new ideas and rich functionality of Web 2.0 applications.

In contrast, the expectation for what can be done over the Internet when it becomes a real application platform is far beyond what people expected of web sites just a couple of years ago. The evolving technology of Web 2.0 includes server software, content syndication, messaging protocols, and even new web browsers like Firefox, Safari and others.

From a technology standpoint, there are some new web techniques that characterize a Web 2.0 system. Typically, one or more of the following technologies will be employed: AJAX, CSS, Syndication and aggregation of data, clean and meaningful URLs, “Mashups”, REST or XML Web Services; many also take advantage of Adobe Flash technologies. From an overall business approach, or application standpoint, a few key differences emerge:

- The web becomes more like a platform, as opposed to a simple view of an application running on an operating system like Microsoft Windows.
- Data is an integral part of the process.
- Network effects are created by users participating in defining the applications; many Web 2.0 applications employ a user-controlled, collaborative model.
- Systems and sites are composed by pulling together features from distributed, independent developers (a kind of “open source” development.)
- Business models are enabled by content and service syndication.
- The software lifecycle appears to be automated—the user gets new features and benefits frequently, instead of waiting for long release cycles and product shipments.

Web 2.0 is a beneficiary of many of the technology advanced we discussed before as having a positive impact on print production workflow. Notably, the availability of extremely inexpensive, massive storage and Internet bandwidth has enabled many Web 2.0 applications focused on content creation and sharing. This, in turn, will drive Web-To-Print 2.0 applications (see below).

However, Web 2.0 is not all good news for print. Like the 1.0 Internet applications and technologies, very little thought has been given to delivering content into print production workflow. A great example of this is Adobe Flash content. Some Flash content can be output to PDF or directly to an output device using File-Print from a desktop workstation. While some of the content that can be output is appropriate for printing (versus a “movie” or other moving graphic), much content that should be printable is not. Furthermore, at this writing, there is no automated, reliable way to print Flash content from a server. And while there are plenty of tools to convert PDF files to Flash, there is no effective way to convert Flash to PDF, which might represent a decent path to print such content.

The View from End-To-End

We’ve discussed where the job flow is originating, and in general terms, how it is created. To efficiently handle all these new and disparate content streams, while at the same time continuing to process the existing job flow, the tried and true best practice method for best approach is to normalize all incoming content, prior to entering production workflow.

File Formats

Web-To-Print may be able to deliver a seamless flow of single-format files into your workflow. If a print service provider creates a web-based storefront with static print-on-demand documents, he can choose the document format that will be employed to support orders being placed. Similarly, if the storefront has a set of customizable, template-driven documents, they, too, can be in a service-provider-defined format.

The challenge for most Web-To-Print applications is job submission. This is defined by the ability to allow customers to submit new jobs into production, whether via a web storefront or via an API or other programmatic method. In addition to being able to allow the customer to describe the document they wish to produce, which has its own set of challenges, there must be a way to efficiently handle a variety of file formats, normalize them, and bring them into the production workflow.

Print manufacturing operations simply cannot efficiently process input print products of “any” shape and size. Applying constraints to the type of products produced at the output, and then restricting the incoming flow to documents that can reasonably result in those products, will dramatically decrease the burden on the pre-processing aspects of digital production workflow.

Web-To-Print 2.0

Web-To-Print 2.0 will be about applications that are feature rich, and apply intelligence about both how documents creators view their “products”, and how we produce them in the printing company. They will be flexible and configurable by their users, and they will leverage integration with other Web 2.0 applications.

These new applications will understand personalization, and they will provide opportunities for cross-media (i.e., Internet and Email), in addition to and complementing, print products.

Presumably, this integration between the content creation process, the submission process, and the print production workflow processes, will result in the ability to handle a wider range of more sophisticated document types, in an automated way. For example, variable data content formats have historically been proprietary and different from those used for static document creation.

With a Web-To-Print 2.0 application, designers should be enabled to create static or personalized content in a form that can be automatically shared with business users, deployed to the web for consumption by the end recipient in a cross-media situation, and hand it off to production for printing. Marketers and business users will be able to more easily collaborate throughout the process by previewing, proofing, and approving jobs online.

A Manufacturing Approach

Handling input content by normalizing it into a format that can be fed into the workflow, with no or minimal operator intervention is the key to production efficiency. This is an automated manufacturing approach that not standard practice for many print service providers. In effect, the normalized files represent dramatically improved quality raw materials for input to manufacturing.

Taking a manufacturing approach, from end-to-end, creates a Web-to-print workflow that is consistent, reliable, and flexible is will facilitate that goal. Some of the achievable benefits include:

- Cost savings for all job types.

- Automation, from online submission to final printing.
- Synchronization of design and print production capabilities.
- Streamlined workflow for personalization.
- Integrate personalized products into standard static production workflows.
- Allow late-stage modifications of content.
- Allow repurposing of content for the user, as well as to different output devices.
- Improve the accuracy and consistency of color by implementing color management processes and technology.
- Automate imposition to allow content to remain device neutral until output time.

In terms of print manufacturing, Web-To-Print 2.0 will likely be JDF-rich (not just JDF-compatible, or JDF-compliant), and will integrate with workflow and production systems within the facility, to address the increasingly short turns and shorter runs inherent in the business today.

A Simple Use Case

Web-To-Print Workflows are in competition with email on the front end, and non-automated production processes on the backend. With email, many important steps are missing from the transaction. While email is easier (the user simply attaches a file to a message, and describes what they want in an ad-hoc manner), it fails to serve the needs of either the customer or the printer.

First, missing from email is the ability to convert incoming files to PDF or another normalized format; an incredible time-and-labor-saver offered by many Web-To-Print applications today. Also missing is the ability to help the user describe how they want the job produced—within the limitations of the printing company’s production capabilities. Without specifications, there will undoubtedly be follow up phone calls and telephone tag, and the opportunity for mistakes and missed deadlines. Further, the actual money transaction is not possible with email, whereas Web-To-Print solutions allow you to accept the payment from the user in a secure way, whether the method is a cost center, purchase order number, credit card transaction or punch-out to a corporate e-procurement system.

Just because a job is relatively simple, doesn’t preclude the value that a workflow-integrated Web-To-Print solution may bring. Take the example of 10 copies of a 40 page sales presentation created by a user created as two separate documents, one in Microsoft Powerpoint and one in MS Word. The customer wants the job to be delivered with plastic coil binding, clear plastic front cover and black vinyl back cover, printed in color, on a specific 8.5x11 paper stock, including 3 tab separated sections. The customer finishes work on creating the documents at 9:30 at night, and they need the job to be delivered in time for a meeting the next morning at 10:00 AM. With Web-To-Print feeding an automated digital production environment, the following workflow could be accomplished:

- Customer (an end-user, document owner or creator) sitting at their desk in corporate America visits their company’s Intranet portal and clicks on a button that says, “Order Print Here”.
- They upload the content files (both are automatically converted into a PDF, even combined into one PDF file if desired).

- They use a simple, browser-based, job ticket wizard to specify how they want their final print product to be produced.
- Since the user is picking from a menu of available options, they don’t really have to know anything about print—they just need to focus on the product they want.
- They see a realistic preview of the job as it will be produced, giving them confidence that they will receive what they need.
- They approve the “soft” proof immediately.
- They choose when they want it delivered—they are able to see in the interface that the print service provider will be able to deliver the product in the turnaround time they specify.
- They get an automatic price online, which includes everything—printing, shipping, any appropriate taxes, etc.
- They pay for it, using their chosen method.
- The job automatically flows into the workflow solution, and enters the queue to be produced.
- It’s delivered to their office in time for the meeting at 10:00 AM.

The result is that the print service provider has a loyal and happy customer, and one who has unawares become part of the service provider’s production workflow process, adding to the efficiency and profitability of the printing operation.

Summary

The benefits of deploying Web-To-Print applications coupled with integrated workflow for production digital printing far outweigh the challenges. Digital print is a vibrant, fast-moving technology arena, and there will continue to be new hurdles to overcome, but hardware and software manufacturers along with innovative print service providers will continue to blaze the trail toward optimal efficiency and total automation.

References

- [1] Fortune Magazine, May 2006
- [2] Pew Internet and American Life Project, www.pewinternet.org
- [3] PIA/GATF, Print e-business Report, May 2006

Author Biography

Chuck Gehman is Vice President, Product Platforms, at Mimeo.com, Inc. He is a product visionary, who has created web-to-print and workflow solutions used by thousands of companies worldwide. Industry activities include current service on the boards of the NAPL and as a vice president of TAGA. Chuck is a member of the IEEE and ISOC. He has written numerous articles for trade publications, and is the author of three books on topics related to print and IT.