The Need for a Fully Automated Workflow in the Graphic Arts Industry

Digital Process Integration in Print Media Companies

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Abstract

Today’s printers generally face the following trends and challenges in the graphic arts industry:

- shorter run length of jobs
- more complex jobs.

Investigations have revealed that order processing and prepress will become the dominant cost drivers in future graphic arts production. Hence printers have to optimize all processes in a changing environment. Process thinking instead of production focus is needed. A fully automated workflow is needed to make processes more productive, more flexible and more transparent. The future graphic arts will require new tools to manage the complete value chain more efficiently. Thus closed information loops from management to resources and back are needed. Eventually personalized jobs need transparency and flexibility in order management. Process thinking aims at providing the needed resources or taking the results for further processing steps respectively. As a consequence of these fundamental changes in the graphic arts industry, we need more digital thinking and a shift from object automation to print networking. Integrated software solutions will determine what hardware can be used along the value chain.

Heidelberg is developing a complete workflow management system for the Graphic Arts Industry and is providing tools for increased process throughput. The Job Definition Format (JDF) will be the basis of these efforts and dovetails both commercial and production aspects. Management information systems need to have access to the production resources. This is known as vertical system integration. On the other hand, production resources consist of a lot of distinct applications which need to talk in a unified language. This we call the horizontal integration.

Since Heidelberg wants to enable printers to exploit new technologies and create value for the print media, e.g. speed up production using internet tools, it also has to consider workflow scenarios beyond the scope of the classical production components, where e-business modules are required. Such modules have to cover all process steps between quoting and production. Future e-commerce products have to provide modular services which are easy to handle and which will speed up processes, rather than slow them down due to their complexity.

The Role of Software Solutions and Standard Data Formats for Process Optimization in the Graphic Arts Industry

Big Challenges Require Convincing Visions

As the 21st century begins, the Graphic Arts Industry is undergoing a process of profound change from the analog manufacturing of the past, to the digital graphic communication services of the future. Dwindling run lengths, an accelerating trend toward personalization, plus growing cost and time pressures – tomorrow’s print shop needs routines and processes that are both as efficient as possible and optimally integrated.

This time of structural change affects technologies, infrastructure, markets, business organization, processes, and skill sets. The economic forces which push this transformation are far stronger than those that produced the desktop revolution in page make-up during the past decade.

For most printers a higher number of print orders must be acquired, estimated, produced and shipped due to shorter run lengths, in order to maintain turnover and profit. In addition, the impact of cost savings at the production devices will decrease, as production time will amount to only a small portion of total order fulfillment time. This puts pressure on the print shop to rationalize
total order management procedures and to boost performance in the whole print value chain. It sets up the need for highly efficient process management.

To manage these complex processes, modern print companies need seamless software solutions, starting from customer relations management through to shipment of finished products. Because the value chain also includes print buyers as well as paper suppliers or subcontractors, the trend for process integration applies to the entire print network, i.e. dovetailing the workflows of buyer, producer and supplier. This will increase the benefit of complete digital networks for the success of print media companies.

Why is this issue so vital for the future? Because we all live in the age of information. Distributing information efficiently and fast is the key to success, especially in printing and publishing. Information once generated should be usable downstream in the process. Therefore, the Graphic Arts market increasingly needs and demands the integration of business and technical processes. Print shops need to know the current status of a job, where the content data is stored, the job’s cost, what preset data is necessary, etc. Due to many different „software islands“ and formats, a comprehensive approach for the Graphic Arts hasn’t been successful yet.

Seamless Workflow Product Suites based on the Job Definition Format (JDF)

The goal of a digital business and production workflow is to integrate different products and applications and to make the entire process chain completely transparent and controllable. The vision is an end-to-end data flow featuring a modular software design.

Today in many cases the impositioning process is done by experts who have to work on many jobs, one after another. Many times they are not aware of the needs and requirements of the other subsequent steps to be done in the production chain with respect to their own work. This is what I call a production orientation.

On the other hand, process thinking means, that a folding scheme will be defined where each operator knows the entire product. The estimating component of a management information system has to know the product in detail. It will likely be able to define the single sheets and assign the most appropriate folding procedure to them. It now becomes clear that such a decision has a big influence on other work steps too. The impositioning scheme, for example, can be derived directly from the finishing needs. The finishing needs are dictated by the structure of the product itself.

In the heterogeneous product environment of print media businesses, open interfaces form the basis for linking the various software solutions and system controls. With this in mind a joint initiative of Adobe, Agfa, Heidelberg and MAN Roland has defined the most comprehensive standard interface for Graphic Arts Industry, the Job Definition Format (JDF). This will allow manufacturer- and platform-independent networking, and open up a whole new dimension in process automation. The intellectual properties of JDF have been licenced to the CIP3 organization, which was renamed CIP4 (International Cooperation for Integration of Processes in Prepress, Press and Postpress). This international standards body came to life in July 2000 and is responsible for the future development of the JDF standard. Since DRUPA it has doubled its membership.

JDF provides an industry-wide standard for vertical and horizontal integration of workflows. It contains commercial data, as well as production data and content data references. It brings planned data into the processes and collects actual data in production areas. This format is an evolutionary extension of both existing standards, the Print Production Format (PPF) of the CIP3 group and the Portable Job Ticket Format (PJTF).

JDF is compatible to these standards. This means that it is possible for vendors to provide software routines that map all information contained in one of the existing data formats to the new world of JDF.
JDF allows a smooth migration of today’s software products, and hence makes investments in today’s available PPF - or PJTF-based workflow components safe. It provides a rock-solid foundation for the smooth interaction of all process components.

Business-to-Business Relationships and E-Business

The new workflow patterns are about how businesses can best reorganize themselves and the way they do business together. Business-to-business relationships will move to the internet with electronic document interchange (EDI) and electronic commerce (EC) in order to bring transaction costs down and to speed up information exchange. The amount of information being exchanged today on the internet in three days is about the same as the total of all information that was available to mankind in the 19th century.

In the Graphic Arts Industry, printers, print buyers and suppliers will link directly across networks and their systems will interoperate, sharing content, business, and workflow information. They will check each other’s portfolios of products and services, prepare and evaluate specifications, preflight jobs and content, do approvals, track jobs, and do load balancing, all across networks. By doing so they will achieve dramatic improvements in performance measures such as speed, cost, service, flexibility, and quality. The value chain of a printer is no longer restricted to the print shop only. It extends to suppliers and customers because they all provide, and need, information on the same product.

E-Business does not mean that all printers have to be linked to one brokerage platform. E-Business can mean a variety of very different approaches. Market places are basically web-based services which aim to bring together both print buyers and printers. Printers may offer their services to a large community of print buyers (portals), and print buyers can easily choose the best bid. This is not only an increased competition for printers. Usually they will also be the ones who will be charged by the service provider for every order. Another kind of web-based service aims to sell print jobs at an auction. This business model helps the print buyers to purchase an order at its lowest price, but it also increases the competition for the printers to a maximum. Mostly printers will be charged for every order.

In order to manage their processes properly, printers might eventually either run their own website to get orders from their customers, or make use of application service providers (ASP) who offer customized websites to their clients. Application services usually do not charge the printer but the print buyer, and thus do not have a negative impact on the printer’s situation.

Heidelberg aims to be the best partner for the printer. Therefore, Heidelberg will support only those products and services which will help its customers to be more competitive.

Reliable Management Information

Networking print media companies basically means to make processes more transparent and faster. A comprehensive concept for Computer Integrated Printing (CIP) must therefore provide tools and mechanisms for fast decision making based on correct data.

These tools may be considered as components of a state-of-the-art management information system, which in turn has to be modular. Small printers will likely have requirements for such a system different than those of the bigger ones. A warehousing component, for instance, will not have the same priority for both.

Managers need real time information to be able to conduct their business in the most efficient way. Automation puts even more stress on managers because processes run quicker; therefore decision making has to be quicker as well.

One important fact about automation is that it does not take away the responsibility of people for decisions and the quality of the output; it should simply support them in doing so. Providing the real time data basis for management to make the right decisions at the right time is vital for an effective CIP concept.

Managers should be able to get immediate information on the status of print jobs, current costs, the usage of production capacities, productivity and down times, etc. This means in the event of any deviations or problems, he can immediately and effectively intervene to get things back on track without losing any valuable time. Comparative analyses identify needed additional capacities so future investments can be based on reliable information.

Management information functionalities must closely cooperate with the production planning and control systems, ideally to exchange data on the same database making full use of combined information and a seamless workflow. Once an order is placed, the estimating module must create an electronic job bag to distribute all existing information on the job further downstream into production. Once activities start there they have to be closely monitored and controlled in a permanent comparison of planned versus actual.

Efficient Preprint Processes
Although the efficiency of the prepress department itself has improved somewhat over the past decade as a result of the investment in new technology, the production planning department can actually be the bottleneck holding up prepress production. The integration of the production planning and prepress departments could produce significant productivity gains. New technology for production planning should be capable of digitally passing prepress-related decisions seamlessly on to that department.

Prepress will become preparation for a final output, but in the case of finishing, it's remarkable that by the time the workflow reaches prepress, the binding decisions have long been made, and much of the data would have to be reverse-engineered or worse, guessed at. This underlines the importance of having a seamless workflow concept that starts as early in the product specification phase as possible. Why not create the signature and folding schemes when the job is estimated?

The major challenge for prepress workflow activities in the future will be, in fact, a close integration to estimating and production planning systems, to combine the technical workflow with business-related figures. One of the key issues would then be to cover the print creation steps to make them more visible. The JDF concept has also found tremendous acceptance from ad agencies who want to use a common interface to overcome the grey zone of misunderstandings and incomplete information exchange between them and production.

**Increased Productivity in Print Manufacturing Processes**

In the future, conventional printing, while still the most important, will be only one of the output processes that concern printers. Graphic Arts products will expand to include digital and electronic media, networked printing, and networked interactive multimedia.

Of course, boosting the productivity of any department within a print shop has a direct effect on profit. When a company considers investing a quarter of a million dollars in a new computer-to-plate device, very often its primary interest is to save a percentage of that amount per year in time (staff wages) and materials (film), while maintaining or even improving quality and volume throughput. New advanced presses are being manufactured all the time with new ways of reducing make-ready and wash-up time. Prepress technology is communicating the ink key settings that enable further make-ready time saving.

Estimating systems are exactly that – systems that calculate costs based on an estimated manufacturing plan. They have a broad "big picture" perspective of each print shop department as a cost center, and they know the general specifications of each job they are estimating. However, they do not know the crucial details of when the job will be produced or what the circumstances will be in the plant at that time. Thus, they only determine a possible production plan, as opposed to an actual production plan.

**Optimized Delivery and Services**

Once the product has been produced it needs to be delivered to the customer or to any other address the customer may have specified at the beginning. A job ticket like JDF is able to hold all needed information about the delivery process. This includes the possibility to distinguish different subsets or components of a product, each of which has a different delivery address. An electronic job ticket also specifies the due time and the method of delivery, such as "Express Mail" or "Interoffice Mail". JDF may tell the printer whether or not a product will be picked up by the customer rather than be delivered to a certain address. Cell phones, and more recently global positioning systems and wireless Internet (M-commerce), are also enabling more efficient tracking and delivery of printed goods.

Value creation and value delivery will be increasingly digital accomplished through software applications. The value-added will reside as digital information stored in digital libraries. Digital information will become the source, resource, and knowledge core of the new value flows. New workflows will generate value by accommodating changing user demands and by managing content recycling and redistribution needs.

**Implications for the Suppliers of the Graphic Arts Industry**

The paradigms for manufacturers are the same as for their customers: get digital; get networked; re-engineer for the new business infrastructure. Internet usage and digitization will change the basis for value creation and value delivery. In so doing, it offers opportunities to re-align the product portfolio and value-added selling of networking components. However, to exploit the opportunities, manufacturers will need new strategies for product development, marketing, distribution channels, and customer support.

**Benefits of Computer Integrated Printing**

Managing business and production processes through a seamless Heidelberg software solution, from order acquisition to shipment of finished goods, will save money through cost reductions, by shortening job
times, reducing mistakes, improving communications and consistency of parameters. In addition, it will help the printer to focus on the right issues, improve interactions with his customers and suppliers, and therefore make additional profits.

A printer’s productivity can be severely affected when just one of their most skilled staff members is temporarily absent, or even worse, permanently leaves the company. By investing money in automation tools, a company is able to automate the application of complex business rules by less skilled staff under such circumstances. This investment diminishes the risk associated with tying a company’s success to a few specialized craftsmen who are hard to replace, and also standardizes the quality of work produced. In some respects, turnaround time is more important than quality in today’s competitive marketplace. Regardless of the quality of the film and proofs your company can produce, if the job can only be delivered on Thursday when the customer needs it on Wednesday, you don’t win the job. Many of the cost savings gained from the use of new technology are less direct. For example, the monthly cost of consumables, like film, can be significantly reduced when all the intermediate steps of final film production are replaced with a digital process.

Every company has its star performer – the one who is given all the jobs requiring that special touch. New technology can deliver the same consistently high quality regardless of the operator. Consistency makes the whole production process easier and more predictable.

The Road Ahead: How to get Digitally Networked

Why do so many print shops hesitate to invest into seamless workflow solutions? One reason might be that there haven’t been any yet. But even now, as comprehensive integration scenarios are at hand, printers are somewhat reluctant to accept the idea of improving the networking of their business. The reason is because this procurement task is completely different than buying a stand-alone hardware like a printing press or a stitcher.

A CIP concept is not a clearly-defined product by the vendor with a full list of features and functions. A CIP concept is a powerful tool to support and rationalize the processes in a print shop. But a tool can only be used when the purpose of using it is quite clear and documented.

Getting integration started means becoming aware of your core business and production processes, how you want them to be aligned, and what information should be provided. So a complete requirement document (technical product specification) is needed to discuss a CIP concept successfully with your suppliers. The first section is the strategy, the second the processes, and the third are the tools. If you use tools in a chaotic environment nothing will improve.

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Thank you

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