

# CIM, JDF, JMF

## Putting It All Together

*There's a lot of hype and interest in CIM and JDF but not many involved in the graphic communications industry are actually using it.*

BY CHARLES BLANCHARD

One of the guys we work with has been involved in the graphic communication industry for years—except for about a year when he worked for a manufacturing automation software company. Whenever we talk about computer integrated manufacturing (CIM), he tells us of the time he drove up to visit an Anheuser Busch plant, an enormous structure probably three hundred feet wide and perhaps four stories high.

They strolled up to a small control room a short walk away from the facility. There, on a desk, was a PC, probably a Pentium. The operator said, “You see that plant? Except for the bottling, I can control the entire facility, including the brewing of our beer, from this PC. I can monitor the temperatures of the mixtures, how much liquid is in each vat, how much time is remaining before the beer is ready—everything can be followed every step of the way. I can even change the settings from this computer and concoct a new mixture, if I want to.”

That was about ten years ago.

That data is now being sent to ERP (Enterprise Resource Planning) systems too. Batch process manufacturing is much easier to monitor than custom manufacturing, like printing. That is why many of those involved in batch process manufacturing have implemented CIM.

In printing, it seems like almost no one is involved in CIM. There's a lot of hype and interest in CIM and JDF (and its complementary messaging format, JMF), and a lot of vendors are screaming about it from the top of their lungs, but not many printers are using it. Many printers know what CIM and JDF are, but they don't understand it. For people to use it, it has to be embraced and implemented slowly but surely.

It will happen, particularly as standards for the graphic arts industry are defined and implemented and the line from creation to completion grows even shorter. JDF and XML will form the basis for the reliable and predictable distribution of most publishable data to various print and publishing media. To make it easier for content creators, Adobe's Extensible Metadata Platform (XMP) is a potent technology that allows users to embed JDF metadata into files. Using XMP, all business and print applications are able to easily write, store and share the metadata—thus helping to build more efficient workflows where the files actually have information about what needs to happen to them and what has already happened.

### What Is CIM?

Computer Integrated Manufacturing (CIM) is the process of automating various functions in a manufacturing company (business, engineering, and production) by combining hardware and software technologies and integrating the work through computer networks and common databases. CIM is a critical element in the competitive strategy of manufacturing firms—from car manufacturers to paper clip producers—because it lowers costs, improves delivery times and improves quality. Done right, it greatly reduces the number of “transactions” necessary to produce a product.

One of the key issues regarding CIM is equipment incompatibility and difficulty of integration of protocols. Integrating different brand equipment is a time-consuming task. The large investment and time required for software, hardware, communications, and integration often cannot be financially justified easily.



One of the key issues regarding CIM is equipment incompatibility and difficulty of integration of protocols. Software, hardware, and communications have to be integrated to talk to one another for CIM to become a reality.

Computer integrated manufacturing is no cure-all. It is an operational tool that, if implemented properly, provides a new dimension to competing: quickly producing high quality products and delivering them with unprecedented lead times and swift decisions.

The “language” to get us there is JDF.

### **So What Is JDF Anyway?**

Just like any other industry, the printing and publishing industry has standard nomenclature that has to be defined to help describe how certain processes are done.

For printing, Job Description Format (JDF) is a systems-independent “language” to standardize the exchange of information between different graphic communication applications and systems and processes. It is not a data format itself. It is really a “metadata” format (data about data or processes describing the form, function, intent and process of the actual file data). JDF is really a standard for any digital file, describing every possible specification required to produce any type of print job. Exact job specifications can be tailored to the type of work—for example, the number of pages, color and ink settings, binding type, deadlines, and even

shipping instructions. JDF also defines all the processes and resources needed to complete a project, and allows everyone, wherever they are, to see its status in real time, at any production stage.

To assure it is as open as possible, JDF is governed by the International Cooperation for the Integration of Processes in Prepress, Press and Postpress (CIP4), and is written in XML (eXtensible Markup Language), a simple yet versatile file format. XML was chosen as the basis for JDF because it is already being used in publishing, editorial and catalog printing.

With JDF the hope is that we finally have a universal standard for content creators, prepress service providers, printers and postpress services (including binderies and finishers), enabling everyone to communicate and transmit details of a print job through digital workflows from creation to completion. This has been somewhat possible for a number of years by some workflow companies who have used open database, communications and protocol standards. But the difference with JDF is that now everyone will use the same standard set of descriptions, implementing a process that is totally independent of application, system, platform, or even language.

**Then, What Is JMF?**

As we all know, a workflow system is a dynamic set of interacting processes, devices and MIS systems working on a job. For the workflow to run efficiently, these processes and devices must communicate and interact in a well-defined manner. Ultimately, in a perfect system, the MIS system oversees everything about a workflow. However, it

needs a way to connect to the entire workflow and understand what's going on—in real time. This is the reason for the Job Messaging Format (JMF), a messaging system for JDF information. It helps send information between MIS and production systems. The format provides for a number of different types of messages, from simple notification to other devices to queries and to requests of other devices. JMF is a low level communication system. Think of it like you think of TCP/IP for your computer network.

JMF helps production workflow hardware and software systems in a JDF workflow communicate with administrative components and system controllers. It helps exchange dynamic data in real time, such as information from various production devices, status messages and queue management, by sending direct commands to and from different devices.

The sending machine (or computer) is configured to understand the receiving machine. They use an http query to communicate. Each device registers itself, with an IP address on the server system, as a JDF receiver.

Information then travels from one device through the server to the other device, via JMF, to get up to date information.

For example, one device can say, "I'm a laser printer. Whenever you're ready, feel free to send me JDF job parameters for my RIP. I'll be happy to send you back information about the status of the job from my end, via JMF, as I complete it."

By doing so, system components can collect performance data for each piece of equipment. If this job-tracking data is sent to an MIS system, it can be

sent to a job-tracking system to assess how a job is progressing. After the fact, information about a completed job can be sent to an accounting system to cost out the job.

**The High-Level Vision for JDF and CIM**

The vision for JDF and CIM is a total production workflow solution for the graphic communication industry that embraces every facet of production—a solution where businesses can deliver faster and higher quality services, more accurate production feedback in real-time, and one that ensures applications and systems—even from different manufacturers—can seamlessly interact with one another.

The hope is that JDF pushes the industry towards CIM, applying manufacturing parameters—and best practices—to production. JDF will help production professionals to take out the "blur" from the production process. While a job is being processed, a continual data stream of job metadata is fed into costing, billing and MIS systems. Prepress production systems will poll and work intimately with production databases, reporting on how much time each portion of a job took. The individual production status of job elements, pages and proofs will be automatically tracked within the entire workflow. Statistical analyses can be triggered from the click of a mouse to determine profitability per job, customer or cost center.

But with CIM you don't have to think locally. Describing a job in JDF can be even more helpful should a job leave your plant. For example, imagine if a plant in Hong Kong has to print the same magazine that you have just printed in the States. JDF allows you to describe the job in "print Esperanto"—a universal language everyone can understand.

**What Will JDF and CIM Do for Me?**

You may well have a great communication and reporting system that trickles down from the originator all the way to the newsstand. "Do this, then do that, and (with fingers crossed) you may well have something printed." However, it would be helpful to have a reporting system that is bidirectional. For example, if the platesetter autoloader were no longer "auto," it would be great if those in the plating/prepress department receive a warning. And, if fixing the problem causes a delay, it would be helpful for your customer to automatically receive an alert that the job may be a bit late. (Then

**What Will JDF & CIM Do?**

**JDF and CIM promise to give you the tools to deliver faster and higher quality services and more accurate production feedback in real time. While a job is being processed, a continual stream of job metadata can be fed into costing, billing and MIS systems. They not only deliver greater accuracy in cost and estimate determination by connecting production and management systems together but also result in a much more efficient and effective use of available resources. And, you'll be able to choose equipment purely based on technical and/or commercial merits, rather than wondering whether it will work with your system. In the end, you'll benefit from being able to do more work with the same amount of equipment.**



again, maybe it wouldn't.) Getting everyone on the same page is why a JDF-based production system can be invaluable. And if there is sensitive information that you don't want to share, with everyone (for example, your customer) that can be set up as well.

So, what can JDF do? Right now, many departments have to re-enter the same details when a job enters their own systems. This creates opportunities for error, along with adding a significant amount of unnecessary tasks. Using JDF, this production fragmentation becomes minimized and the process becomes more streamlined. Once a job request is received and the job accepted, the JDF file is passed on to the workflow system where job instructions are carried out. At every stage, one system talks to another to determine if it can handle a particular part of the job. At the same time each system can keep all the other systems updated with the job's production status, even linking into MIS-type systems as necessary. And, everyone concerned can see its status—wherever they are—at any production stage.

Perhaps you outsource a portion of a job. What if you print the body of a book in-house, but someone else prints the cover? Eventually, it all has to come together at the bindery. When you outsource your job, you want to be assured that the subcontractor's production department understands this. JDF promises that this will happen (or if it doesn't, that everyone knows about it).

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### **What Won't JDF and CIM Do for Me?**

A quick note here: JDF and CIM help create a system for print production that helps streamline the production. They will not fix your plant and make it effi-

cient on their own. Part of the process of implementing JDF requires that you know how your plant systematically produces graphic materials and that you have a defined workflow system in place. JDF and CIM will then allow you to connect your different workflow systems along with the business sys-

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tems. Then you will be able to automate production throughout the supply chain and to generate real-time reporting on what the workflow has done to your files, how much the job costs you, or how much you can bill the customer. If you cannot define it easily, no computerized system will help. In fact, it is likely you won't even be able to install a reporting system. You won't know what to report. If you have an organized approach to production, the automation and reporting that comes from CIM will make you more efficient and point out deficiencies for improvement. That's the final reward from CIM. And, in this world of tight margins, it can be the difference between life and death.

### **The Reality**

The reality is that much of what JDF promises can be done today without JDF. Many workflows use open databases and poll them, pulling and sending information. However, today there isn't one system that can talk throughout the entire workflow using the same original data, because different vendors' boxes can't talk to each other. JDF allows systems from various manufacturers to read and understand data in the same way.

Simply connecting stages within printing workflows is one thing. Actually making them understand what they have to do in their own language is something quite different. While every industry manufacturer seems to be promoting how their systems are "fully JDF compliant," don't take it as gospel. True JDF "implementation" is caught between a rock and a hard place. Potential users

### Suggestions to Approaching JDF

Although JDF is still in its infancy, graphic solutions providers need to begin preparing for it now.

►Take a hard look at your operation. Identify and schematize your workflows and find a common fit. Hunt down all the production parameters. Gather job ticket information in all the manufacturing parameters.

►Normalizing that data is the key to success. It is the preliminary information that is important. Don't flood the job ticket with parameters that won't be used. Get only the information you need from your customers. By limiting the manufacturing parameters to the bare minimum of entries and variables, you are reducing the possibility to create an error.

►Start with one piece of the process—for example, imposition. Begin by identifying, documenting, and evaluating the results. Start small, working in a laboratory-like environment. Then bring the JDF lab solution to the real production. If the solution works there, take it a step further to ensure it works everywhere. Once you have perfected that piece, go to the next.

are waiting for a JDF-enabled system (whether they're in the position to **buy** everything is a different matter), and manufacturers are waiting for demand before offering such a system.

When JDF and JMF integrate a complete full process, then it becomes true CIM. Talk all you want, but until binders and palletizers and presses and asset management systems and all other hardware and software work together, it is not a complete system.

With everything that's been touted about JDF, the fact is that although the implementation of JDF-enabled communications can be prepared for you (to some degree), the system is still up to you. It can be anything you want it to be. Although in theory the JDF file is created when the job is drafted and its specifications are entered into a JDF-capable system—perhaps directly into a printer's management information system—in practice, the JDF file could be created at any stage of the chain.

When you think about it, there are still islands of integration in printing, even as systems have become more automated. There still isn't a single control point—from the photographer or editor to page assemblers to artists to publishers to in-house corporate marketing departments; from prepress to printing to binding to fulfillment to mailing, shipping and delivery. JDF allows you to bridge all islands to

form one large integrated system. Then—and only then—it becomes a virtual CIM.

The islands don't talk within themselves, but are all processes that communicate from a single point. The content originator owns a content management system that will manage the use of content—and communicate via JDF. The print production system will create a job ticket and estimate a job—and communicate via JDF. The prepress workflow will take a file and prepare it for output—and communicate via JDF. The press and finishing departments both have systems to oversee their operations—and communicate via JDF... and so on through fulfillment and shipping.

To the end user, the sum is more valuable than the parts. When you can tie all the islands, linking all of the hardware and software together and define the entire process of CIM, JDF is the language allowing you to combine the pieces and provide a larger, higher level view of projects from start to finish.

So with the models becoming *distribute and print* rather than *print and distribute*, who ultimately owns the controlling MIS interest? It could reside in the ERP systems of the content originator, like SAP or Peoplesoft. More and more, companies are moving to ERP solutions to manage print processes when before they were not.

### What Am I Supposed to Do with JDF and CIM?

The good news is that most of the communications work is being done by vendors. If you buy JDF-enabled hardware and software, that's half the battle. And, many vendors are happy to offer you software or upgrades to your existing equipment. Since JDF-enabled devices communicate directly, little to no user intervention is required. In fact, many participants of a JDF-enabled production system may not even know that the system utilizes JDF at all.

But remember: JDF is not a specific process, but rather a set of reporting rules that help you define how your prepress department works. You have to spend the time understanding how work flows through your operation before JDF implementation can help. Until you have a grasp of how your plant works, CIM and JDF are useless.

With that in mind, here are some suggestions to help approach JDF:

- Take a hard look at your operation. Identify and schematize your workflows and find a common fit. JDF is forcing companies to look at production



# Graphic Workflow Process

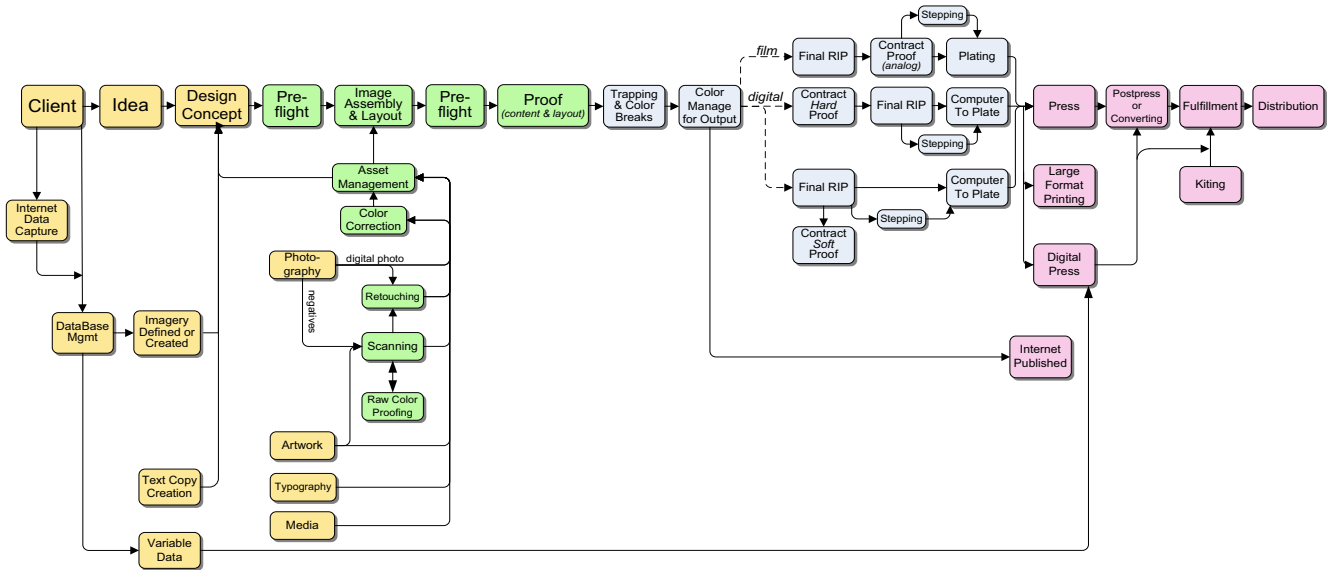
IPA Workflow TEAM

Creative

Premedia

Prepress

Output



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Part of the process of implementing JDF requires that you know how your plant systematically produces graphic materials and that you have a defined workflow system in place. To help companies define their workflow systems, IPA's Workflow TEAM has developed this graphic workflow process.

more scientifically and procedurally. Hunt down all the production parameters. For example: producing a catalog, you need to know how it is printed, bound, the CTP equipment, preferred file format, whether or not the files need to be trapped, what resolution, what color space, and so on. You have to gather job ticket information and all the manufacturing parameters.

- Normalizing that data is the key to success. It's the preliminary information that's important. Don't worry about extraneous stuff in the beginning. Don't flood the job ticket with parameters that won't be used. Get only the information you need from your customers. Factual discipline is what's important. By limiting the manufacturing parameters to the bare minimum of entries and variables, you're reducing the possibility to create an error.

- Start with one piece of the process—for example, imposition. Begin by identifying, documenting, and evaluating the results. Start small, working in a laboratory-like environment. Then, bring the JDF lab

solution to the real production. If the solution works there, take it a step further to ensure it not only works for you, but everywhere. It would probably help to involve your suppliers and partners in this. Once you have perfected that piece, go to the next.

JDF is still in its infancy. At tradeshows you can see a number of implementations of pieces that work very well but might not have been tested in a full-fledged production environment. But the technology and process is maturing quickly. Don't fall into the trap of listening to vendors who say what JDF "will be" (perhaps even this article). The systems integration is happening today in companies large and small.

Get the facts, get the specs, and get your facility in order. Start knocking down the JDF barriers, one step at a time. Start getting your partners—the other islands—in step. Then, perhaps, sometime in the future, you'll be able to look at your computer, point to a group, and tell them, "I can control the entire production process from this one computer." 