

WORKFLOW & DATAFLOW ISSUES WHEN IMPLEMENTING COMPUTER-TO-PLATE

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Abstract: We will examine the dataflow issues involved in computer-to-plate (C-t-P) and the complementary technologies required to make it functional. We will also explore the workflow changes required to effectively implement this technology. Customer profiles will be used to show firsthand how these C-t-P pioneers have successfully bridged these issues and how they are realizing benefits they did not even expect.

Introduction

It is possible to consider workflow in a C-t-P environment as a simple variation to traditional workflow. Since C-t-P workflow is inherently digital, we can simply replace the traditional workflow system elements which are analog with their digital counterparts and proceed to implement C-t-P. This approach can be effective, however, in order to acquire the full benefits of C-t-P, a more holistic approach is required.

Traditional Workflow

Figure 1 illustrates a traditional workflow for a 4 color commercial printer. This process begins when the printer receives a job from a customer who could be a publisher, ad agency / public relations firm, or client (depending on the application). A job folder is created with all the appropriate requirements defined:

- Paper / Ink
- Binding / Format Size / Run Length
- Color Photographs
Type, Number, Placement

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- Scanning
 - Correction
 - Proofing
- Page Layout
 - Design Environment
 - Layout Proof
- Trapping
 - Special Instructions

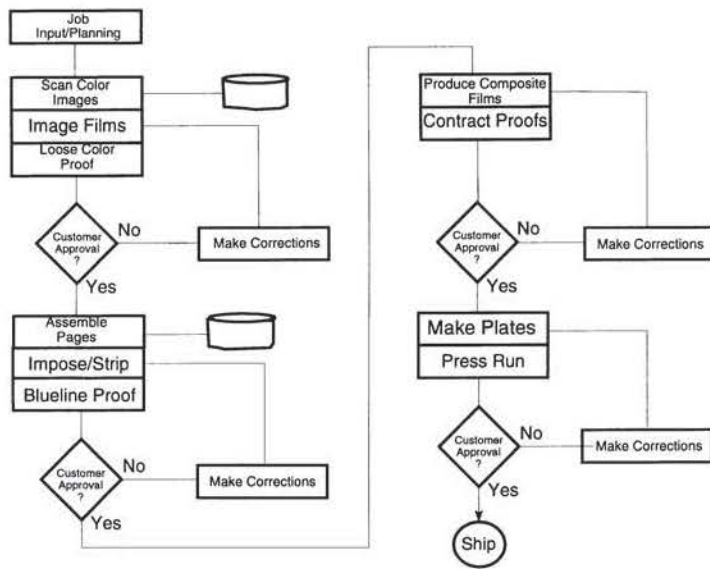


Figure 1 - Traditional Workflow

Based on these inputs, job tickets will be assigned to all the functional departments and the print job will flow through the shop with usually excellent and predictable results.

Note, in the Figure 1 traditional workflow, the involvement of the customer throughout the process. These approval steps can occur at one or more of the following steps:

- Loose Color Proofs
- Mechanical / Layout Proofs (Bluelines)
- Contract Proof (Composite Chromalins™ / Matchprints™)
- Press Proof

With this type of workflow, the customer is provided with wide access and control of the print job up until, and including, the press run. This process is designed to give him exactly what he wants for a printed product. This “job control” approach does come with a price, however, which includes loss of timeliness and additional expenses due to proofing charges, revisions, and consultations.

Hybrid Workflow

Figure 2 shows a simple variation on this workflow which includes digital platemaking. In this variation, digital page data is imposed, using commercially available software, to create final color separated plates. This is being done today in various commercial installations. These printers are enjoying the benefits of:

- Automated stripping with labor and material savings
- Higher quality plates
- Quicker make ready

These items alone can effectively justify C-t-P.

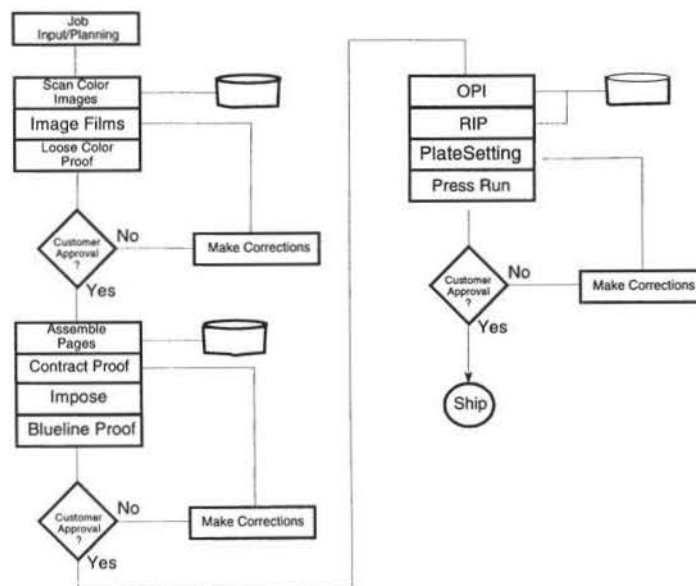


Figure 2 - Hybrid Workflow

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System Elements

There are a number of system elements which are available commercially around which a digital workflow can be engineered:

Input Scanning

- Types
 - Desktop
 - High End
 - Copy Dot
- Format
 - TIFF.IT
 - EPS / DCS

OPI Servers

- Network Interface
- Storage / Retrieval / Archiving
- High/Low Resolution Replacement
- RAID Disk Architectures
- Print Queuing
- Image Database

Networking

- Ethernet
 - 10 Base T
 - 100 Base T
- Switched Hub Ethernet
- FDDI
- Fiber Channel

Proofing

- Imposition
 - Ink Jet
 - Electrostatic
- Soft
- Color
 - Ink Jet
 - Dye - Sublimation
 - Laser Dot
 - Dot-less

Color Management

- Standards Based
- Common RIP
- Application Dependant Color Attributes
- Closed Loop Calibration
- Device Profiles

Imposition

- Standard Bindery Templates
- Pre-Flight Checking
- OPI Capability
- Links to Proprietary Environments (CEPS)
- Cut Lines / Fold Marks / Calibration Targets

RIP

- PostScript / CEPS Data
- Hardware / Software / Accelerator Based
- Single / Multiple Processor
- Single / Multiple RIP Per Platesetter

Platesetting

- Multi Resolution
- Multi Media
- Metal Plate
- Polyester Plate
- Film
- Daylight Operation
- Manual / Automatic
- On-Line Processing

Engineered Workflow

Both the traditional and hybrid workflows are contrasted with another workflow shown in Figure 3. This workflow is taken from one of our Crescent/42 installations at Publishers Press in Shepherdsville, Kentucky. Publishers Press was the first printer to print an entire magazine from computer to plate (Sports Car International May '94 issue). They are in the process of increasing their production of periodicals through this system to a total of 23, consisting of 1 weekly, 19 monthlies, and 3 miscellaneous with intentions of further increases to 100 periodicals.

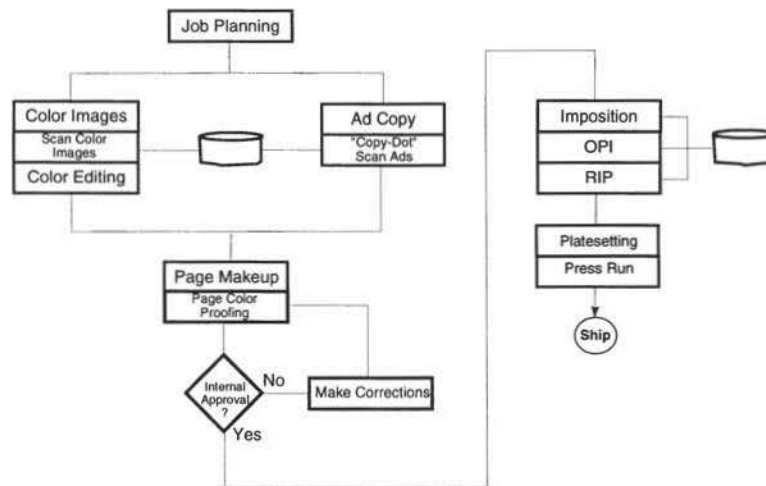


Figure 3 - Traditional Workflow

The Publishers Press workflow illustrates a design which has been engineered around digital C-t-P in order to provide unique service and benefits to their clients. This process begins with the data arriving, surprisingly, in analog form as photographs and transparencies. These are scanned and color corrected within Publishers Press on high end scanners. We can expect these scanners

to eventually be replaced by desktop scanners as their performance improves. A low resolution "For Placement Only" (FPO) set of files are returned to the client either on digital media or over Internet via File Transfer Protocol (FTP).

The publisher will take the low resolution scan files, combine them with text and line work, and then return the composed pages to Publishers Press with the FPO pictures in place. This data exchange will again be digital: either as shipped digital media or as a network transaction. Page composition is typically done using industry standard PostScript™ applications such as PageMaker™ or Quark Express™. The OPI (Open Pre-Press Interface) server at Publishers Press, meanwhile, is storing the high resolution file and will replace the low resolution file with high resolution at output.

One challenge Publishers Press faced was the input of advertising copy. Ad copy is typically provided in the form of pre-separated 4 color films. Since stripping has been eliminated from the workflow, these films must be captured electronically. This is done by scanning them on a "copy-dot" scanner where the scan resolution is set to match the output platemaking resolution in order to avoid moiré. These high resolution files are input in TIFF.IT format and assembled using commercial applications on MacIntosh workstations.

Publishers Press proofs the individual pages as 2-up A3 "Reader's Spreads" internal to their operation. A combination of laser printer and color dye sublimation proof allow them to verify layout, text, color, and trapping. Any necessary corrections are done within Publishers Press using standard software applications.

The key to successful predictive proofing is to drive the proofers from a common RIP using common data. With the advent of dye sublimation technology which offer color gamuts exceeding SWOP inks, in combination with color management systems which control performance to an industry standard; color proofs can accurately predict on press performance. The remaining issue of subject sensitive moiré can be managed by other techniques, including stochastic screening. Additionally, other proofing requirements of layout or imposition proofs can be addressed by large area electrostatic or color ink jet devices driven by a common RIP.

The page files with pictures in place (low resolution) are then imposed at Publishers Press in an 8-up format using an industry standard imposition application program. Imposition templates have been pre-designed for the unique requirements of each publication. These contain binding formats, cut and fold marks, and color calibration targets.

OPI servers in this configuration are at the heart of the system. They distribute data throughout the system, but especially from the composition workstations

(typically MacIntoshes) through the server to the output devices. Many OPI servers offer enhanced network protocols which take print requests from the MacIntosh workstations quickly, thereby freeing them for other tasks. The OPI servers also perform the task of low and high resolution picture file management which performs the task of picture substitution, depending on the application. This has the advantage of minimizing network traffic which maximizes throughput.

In conjunction with the OPI server, a switched hub technology is frequently employed to further enhance throughput. In short, this technology, shown in Figure 4, enhances standard Ethernet network communications through sophisticated collision avoidance means, thereby substantially improving efficiency. This technology delivers approximately 75 mbytes / min communication between the MacIntosh and OPI server and preserves common communication protocols such as EtherTalk.

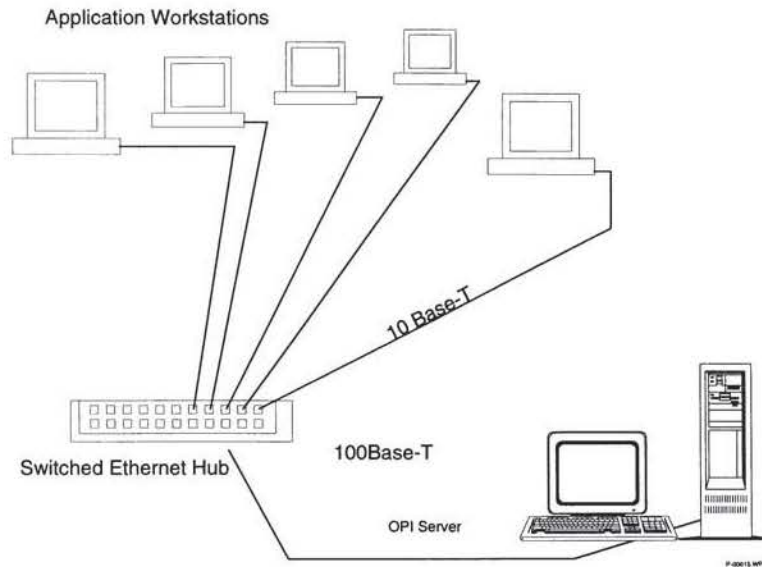


Figure 4 - Switched ethernet hub

Benefits

Publishers Press is reaping substantial benefits from this digital workflow which has been engineered around computer-to-plate. Besides the normally predicted savings from automated stripping which includes film and labor elimination, Publishers Press is reporting:

Higher Production Efficiency

The typical production cycle has gone from over 10 days to less than 7 which has, in turn, give the publishers an extended closing date for advertising.

Higher Throughput

The improved throughput from the digital C-t-P workflow has allowed Publishers Press to expand production currently to 23 periodicals and well beyond that in the future with 2 GSC Crescent/42 Platesetters.

Tighter Quality Control

By eliminating intermediate films with their process variabilities, Publishers Press has found they have much tighter control of plate quality (dot gain, edge acuity, and plate register). This, in turn, has produced more accurate and predictive color as well as shorter press Make Readys.

Printer Offers Higher Value to the Marketplace

With this engineered workflow, the publisher knows in advance that his periodical will be published at an exceptional quality level, on time, per order, if he provides his input in the agreed upon format. From that hand-off, everything else is the responsibility of the printer.

C-t-P is far more, then, than an automating technology which produces efficiencies.

C-t-P is an enabling technology which can open up new opportunities to printers to serve their markets. The system elements are available today around which workflows can be engineered which deliver unique benefits to the marketplace. Through innovative digital workflow and computer-to-plate technology, the printer is able to add more value to the printed product. This added value can be translated directly to the bottom line.

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