

Choosing the right digital front end

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1. Abstract

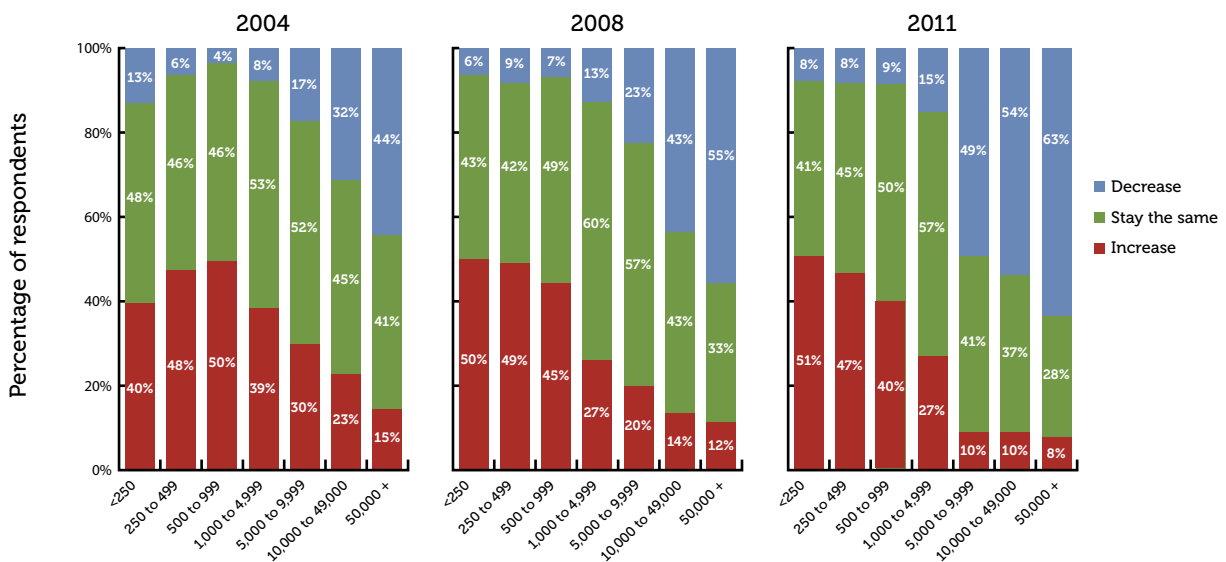
Since its introduction to the market in 1993, digital color production printing has achieved wide acceptance with improved quality and productivity, larger sheet sizes, and the unique capabilities digital printing enables. However, the choice of a digital front end (DFE) impacts these capabilities, and is perhaps one of the most overlooked decisions in the purchasing process.

In this white paper, we will examine the elements that purchasers of digital presses should consider when making a DFE decision. This includes how the increasingly functional components of a DFE can be leveraged in the overall workflow to improve quality and productivity, and to achieve the best possible ROI on digital printing investments.

2. Introduction

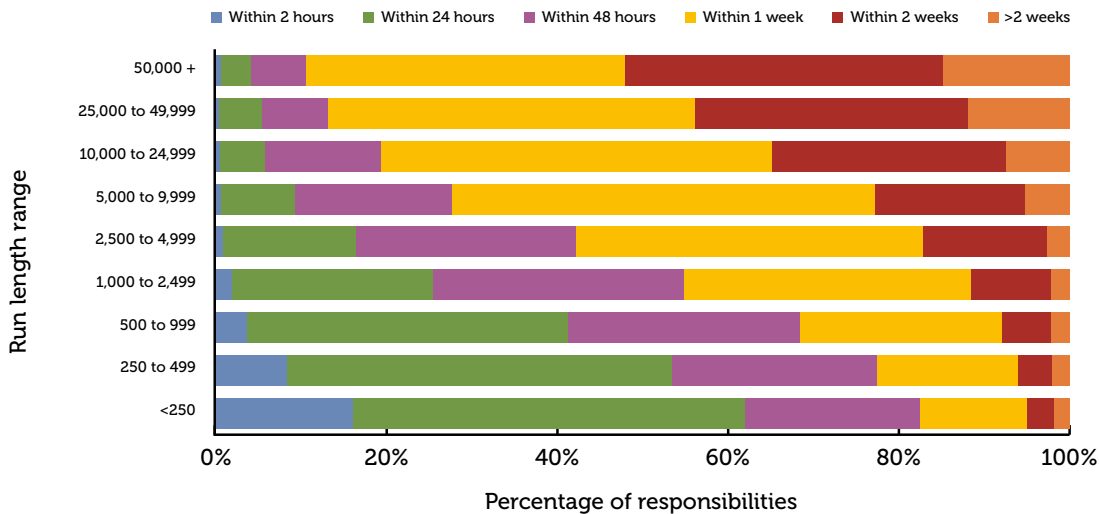
The installed base of, and the volumes or pages produced by, electrophotographic color digital presses continues to grow. With the current generation of production digital presses, quality is equivalent to offset for most purposes. In addition, digital printing is more cost-effective for the shorter runs and faster turn times that customers are increasingly demanding. See Figure 1 and 2. To meet this demand, print businesses are migrating increasing volumes of work from offset to digital; and, in fact, many print business owners state that they have purchased their last offset press.

Figure 1
Run length range



Source: InfoTrends 2004, 2008, 2011 Print Service Provider Surveys

Figure 2
Run length, turnaround time, and print volume



N = 478

Source: Emerging Trends Q2 2012 Run Length, Turnaround Time and Print Volume, InfoTrends 2011

But the true value of digital printing lies in its ability to cost effectively produce new applications that could not be produced before, most notably, high-quality variable data printing (VDP). These new applications open up new opportunities for printers and their customers alike, generating new revenue streams and, often, higher margins for both.

It is clear that digital printing should be a component of most, if not all, printing businesses. The best way to decide how to purchase these digital presses is less clear. Certainly, buyers expect quality. Speed, sheet size, and other characteristics such as special toners or finishing capabilities, are important considerations. But often overlooked is the digital front end (DFE) and the role it can play in improving overall quality and productivity — while also making it easier to produce new and more complex applications. The analysis needs to include an end-to-end view of workflow, and a total cost calculation that goes beyond the cost of the DFE itself. Rather, it should look at the cost savings, productivity enhancements, improved turnaround time, and differentiation in the printed products that can be achieved with the right DFE and press configuration.

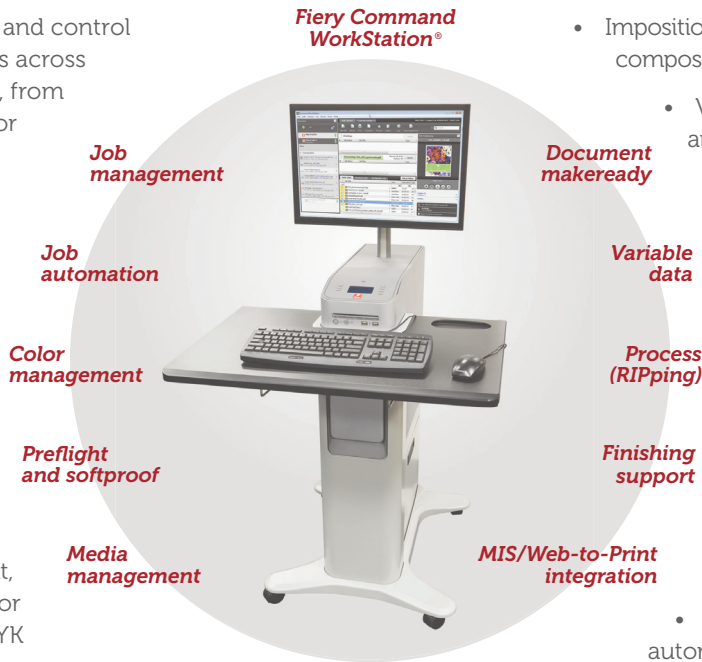
THE ROLE OF THE DFE IN PRODUCTION WORKFLOW

- Efficient job submission: integration with web-to-print systems and automation
- Communication with management information systems (MIS)
- Choice of makeready location: prepress, at the press, or elsewhere in the operation
- Advanced color management tools
- Ability to integrate in a hybrid workflow with offset prepress and workflow solutions
- High-speed processing, especially for variable data jobs
- Management of multiple presses

3. The modern DFE

Over the past couple of decades, manufacturers of DFEs – both native and third-party – have continued to add capabilities to these print servers and to make them more robust. Although capabilities vary from manufacturer to manufacturer, they include:

- Job management and control of multiple devices across multiple locations, from a single interface or from a mobile app
- Hot folder and virtual printers job submission methods to automate profile selection, imposition, and other job setup activities
- Sophisticated color management, including spot color conversion to CMYK
- Prepress automation
- Prepress tools to preflight, soft proof, and troubleshoot file issues



- Imposition software, document composition and/or manipulation
- Variable data tools and processing
- The ability to use multiple RIPs in the DFE to process a single job faster or to RIP multiple jobs simultaneously
 - Late-stage job editing
 - Support for in-line finishing devices and Duplo marks for offline finishing to reduce manual labor
- JDF compliance for automation of tasks and integration with other systems such as web-to-print and print MIS
 - An applications programming interface (API) to connect the DFE to existing custom systems
- Seamless integration between the DFE and prepress workflow software commonly used in a hybrid offset and digital operation

Even if it appears that you don't need all these capabilities today, as an owner, you should consider future needs over a lease period as you make your decision on new equipment. This is particularly important in the dynamic, ever-changing environment we find ourselves in today. What's good enough now, may not be what keeps you competitive in the future. This is why DFE manufacturers continue to invest in future enhancements.

4. The role of the DFE in production

While a DFE can be used to simply process files for print, today’s sophisticated DFEs offer much more than that. These capabilities can be used at the press, or remotely in prepress, depending on the established workflow. Some printing businesses prefer to perform these activities in prepress; others delegate them to the press operator, who is closest to the actual production activity. Either way, taking advantage of these capabilities can increase throughput and quality, reduce errors, and eliminate the need for investment in some other third-party solutions – thus reducing the overall total cost of ownership. While capabilities will vary between DFEs, these are the key capabilities that a press buyer should seek:

4.1 Lights-out automation

For many printing companies, getting to a fully automated operation has been the ultimate goal, and some are nearing that level of automation for parts, if not all, of their work. This is especially important with the growing deployment of web-to-print solutions that receive and process a significant volume of jobs, sometimes even thousands of jobs, each day. Clearly, it is not financially viable to have humans touch each of these jobs as they come through the shop. In these cases, it’s critical to automate from order entry to print – and even finishing, shipping, and invoicing. This level of automation removes touches, time, and potential for error from the process.

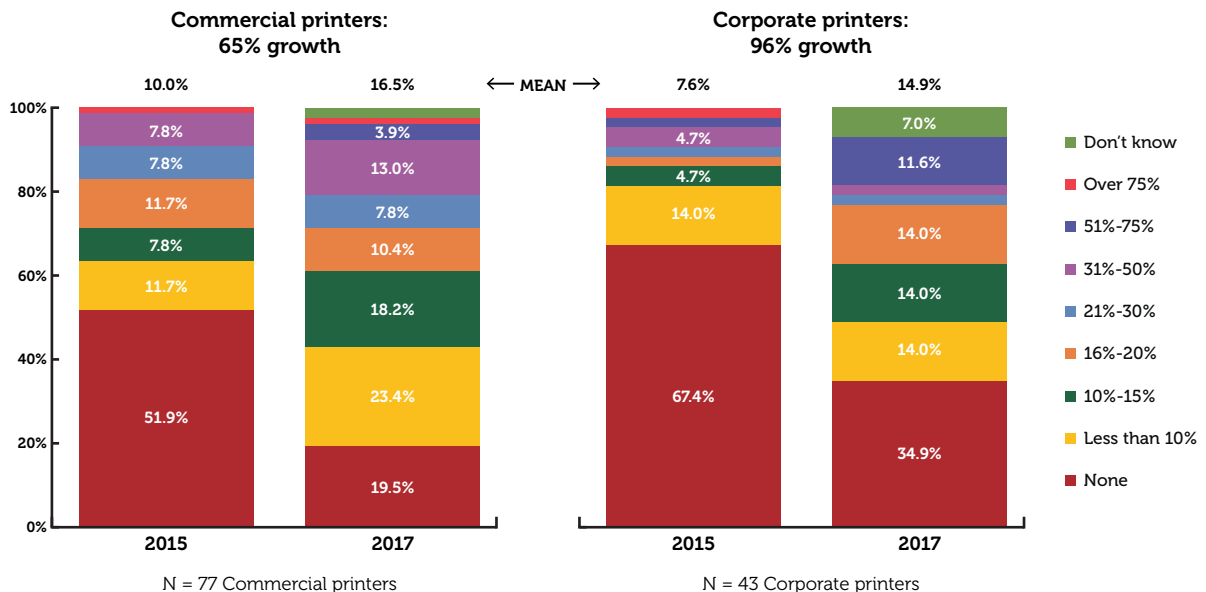
In such an environment, the DFE can play a significant role as an important element of workflow automation for the shop. It can integrate bidirectionally to a digital storefront and print MIS, parse job ticket information, apply color management and substrate profiles in a rules-based approach, load balance across multiple devices and sites, impose jobs, add finishing marks, and more. Operators can then intervene only when an exception occurs. This approach is particularly useful for repetitive, low-margin jobs like business cards, static brochures, and flyers.

InfoTrends research indicates that fully automated workflows will increase by 96% in corporate in-plants and by 65% in commercial printers between 2015 and 2017. See Figure 3.

Figure 3

Volume produced in automated workflows

What percentage of your total digital print volume produced by your business is produced in a 100% automated workflow environment (no human involvement)?



Source: InfoTrends U.S. Production Software Investment Outlook: 2015

4.2 Different strokes for different folks

Not all printing businesses choose to perform file preparation and makeready tasks the same way. Some companies may prefer to have all the work done in a prepress department and deliver print-ready PDF files to the DFE. The argument for this approach is that the operator should be focused on keeping the press calibrated, the color quality up, and the media loaded. They should produce as much volume through the digital press (or presses) as possible, rather than spending time on file manipulation of any type. In this approach, DFEs that have the ability to manage multiple presses from a single interface, such as with Fiery® Command WorkStation® or Fiery Central, allow press operators to focus on optimum press usage.

In this scenario, a robust and integrated DFE and associated workflow software, such as the Fiery Workflow Suite, can add significant value. The file preparation and makeready tasks are done in the prepress department using the client application connected to the DFE, such as Fiery Command

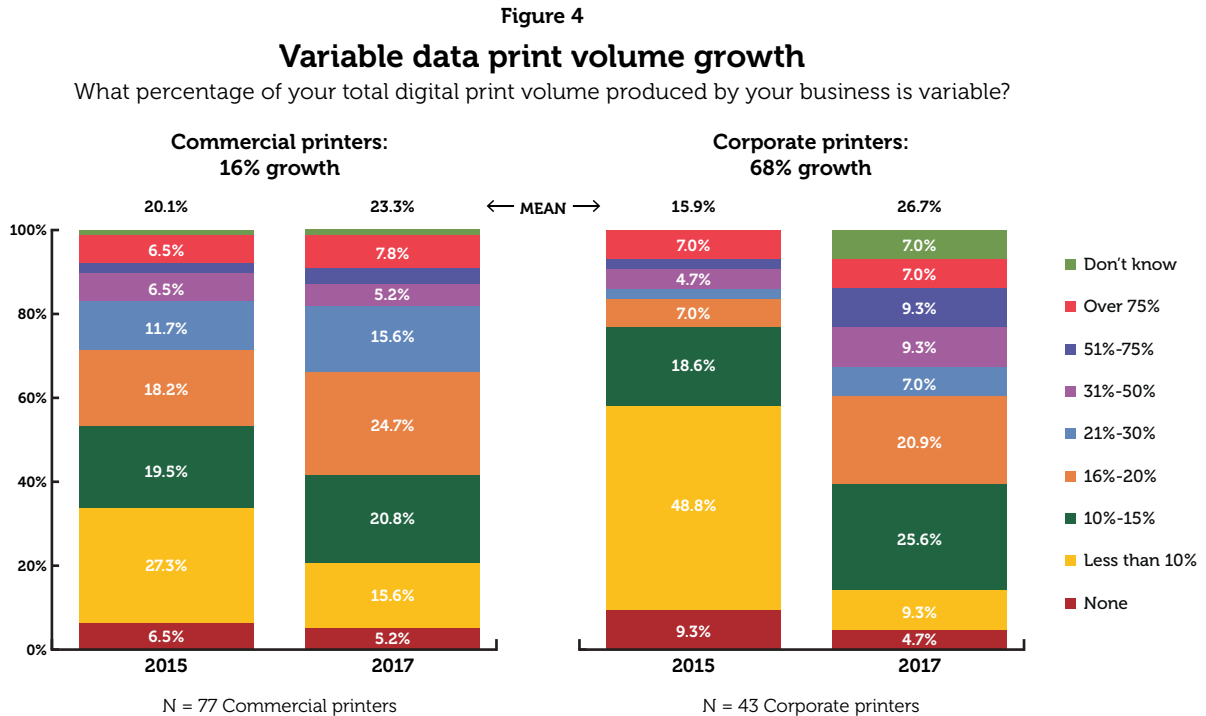
WorkStation. The value of this integration is that prepress personnel can be sure that the job will run as expected on the press.

The other option is to use the capabilities for press operators to make last-minute adjustments at the press. This is often required when there are tight turnaround times and an error is discovered, or when customers need to make a change for some other reason.

4.3 Fast variable data processing

DFEs can also manage production of template-based variable data jobs, merging templates with data to produce final output. This can be vastly more efficient than multi-record, print-ready PDFs that can take longer to process before printing begins, depending on file construction and the number of records.

InfoTrends research indicates that variable data printing will increase by 68% in corporate in-plants and by 16% in commercial printers between 2015 and 2017. See Figure 4.



Source: InfoTrends U.S. Production Software Investment Outlook: 2015

4.4 Multi-vendor environments

Multivendor environments can complicate the choice of a DFE. In many cases, it can result in separate DFEs and different workflows for each press. In some cases, printing businesses even have multiple instances of presses from the same vendor, but each has different front ends for various reasons. Having two different front ends can have some troubleshooting advantages, such as when a problem occurs on one RIP and not the other. However, load balancing or running the same job on multiple machines can be more problematic. There is always a danger that the file handling may not be the same even when actively managing settings and profiles. Using the same type of DFE across all digital presses, when feasible, offers many productivity and workflow advantages.

Another DFE consideration in multi-vendor environments is the ability of a single operator to manage multiple digital presses. If there is more than one type of DFE, it makes it much more difficult for an operator to manage multiple presses.

5. The DFE decision process

If you want to acquire or upgrade a digital press, it's a good time to reevaluate the DFE selection process. What approach did you take in your last DFE decision? Should you consider a different approach in order to take advantage of new capabilities that can benefit your business?

In our discussions with digital printing organizations, we found that decision makers took a variety of different approaches, including:

- **Purchasing made the DFE decision with little or no input from production**

This seems to occur most often in in-plant operations and larger organizations where cost, existing contractual arrangements, or previous decisions take precedence in determining the final configuration of the press. This is not an optimal approach, since it negates the day-to-day knowledge and skills of the production operation and can leave them with a suboptimal solution. While this approach may deliver a lower up-front cost, it can often have repercussions on the total cost of ownership if production professionals do not have the right tools to work with.

- **Buying criteria for a DFE was based only on the current mix of jobs**

The jobs being produced today may not be complex and/or the current staff has minimal skills. There is no perceived need to add cost with DFE capabilities that may never be used. This approach can also have negative longer-term ramifications. Printing businesses running a limited job set that is truly not complex today, and configure their presses accordingly, run the risk that they will encounter future competitive forces that require a broader product capability and higher productivity. Not having this flexibility could compromise business profitability over the course of the lease.

- **Quickly accepting the press manufacturer sales rep's recommendation**

Sales reps eager to close a press sale may not fully present the multiple DFE options offered with the target press. They may encourage the buyer to quickly proceed with the DFE from the press manufacturer. In this case, buyers should avail themselves of the opportunity to research all available options in order to be better educated as they proceed through the sales process. They should be aware of the pros, cons, and capabilities of each DFE that is offered with the press they want. It's important for print businesses to understand how each will fit into a specific workflow and process particular

APPROACHES TO DFE DECISIONS
<ul style="list-style-type: none"> • Purchasing makes the DFE decision with little or no input from production • Basing buying criteria for a DFE only on the current mix of jobs • Accepting the press manufacturer sales rep's recommendation without further investigation • Choosing the same DFE in your current workflow • Investigating DFEs to find the right fit

applications, and consider how each can best be integrated into the overall workflow. And it is critical to test files to ensure the true performance of the DFE.

- **"We've always done it that way"**

In this case, the organization has been using digital presses with a specific DFE for some time. Management has no desire to change, or to even investigate improvements to DFE speed and technology and how enhancements could benefit their operation. The barriers to change may be staff skill levels, the time required for training, and/or the level of automation achieved with the existing DFE. There may be concerns that changing the DFE will consume significant IT resources in order to ensure appropriate integration into existing systems. In this case, decision makers should at least examine the options in order to determine if all or some of their other systems and modules can be replaced by the capabilities of an advanced DFE. Many owners who developed homegrown systems because there were no adequate solutions in the market to meet their needs, are now realizing that they really don't want to be in the software development business. If this is your situation, it may be time to take a fresh look at what is now available in DFEs with built-in integration capability.

- **Investigating DFEs to find the right fit**

The staff is extremely knowledgeable about its digital presses and DFEs and enters into the decision process fully informed and with files in hand, ready to test. This, of course, is the ideal situation. In this scenario, the outcome of the decision is more likely to be a total solution that will lend itself to growth and profitability over time.

In any of these scenarios, doing your homework with an open mind will yield benefits. This can be as simple as reading literature online, or as thorough as the ideal option of attending demonstrations where you can personally test both your routine and complex files against the available options. As we spoke to people, we were quite surprised at how many did not test their own files in the buying process.

6. Choosing the right DFE for your business

Choosing the right DFE can be complicated, but it is an important decision that should be given due consideration. Each printing business is different, and there is no single approach that fits them all. But, as with anything else in technology, things are changing quickly in the world of DFEs; and you owe it to yourself, your company, and your production employees to make an informed decision about DFEs as you consider equipment purchases or upgrades.

Based on the conversations we had with a variety of print business owners, here are some of the key considerations you should keep in mind as you make this decision:

- **Performance**

Depending on your requirements, you should consider how your DFE will handle both large, complex jobs and a high volume of smaller jobs. Both need to be efficient in order to eliminate press wait time. One company we know about has a goal of 2,400 jobs per hour per press, mostly one-off personalized pieces printed multiple-up. While this is an extreme case, it highlights the importance of considering the RIP speed and the ability to RIP multiple jobs simultaneously. It's important to test your most complex files on all available DFEs to verify performance differences. This will help you make a more informed decision.

- **Workflow automation and end-to-end integration**

A thorough analysis of your job mix, if you haven't already done so, will provide you with insight that will be important in making decisions about both the DFE and the press. In many cases, press manufacturers will perform this analysis for you, sometimes for a fee and other times for free. Consider job types and complexity — including specialty work such as tabs — average run lengths, numbers of jobs, and pages you typically produce in a shift, day, or week; plus typical turn times (and whether those need to change).

Analyze the current state of your production platform and organizational infrastructure. If you're acquiring a new production digital press, it can be a good time to re-think your workflow — looking for opportunities to add automation and integration, and improve productivity and quality. Do you already have a digital press? Does it make sense to stay with the existing DFE or is there a benefit to a change; for your new press, your existing press(es), or both? Are there integration opportunities with other systems?

- **DFE integration with business systems**

Do you have homegrown, manual, or customized systems that require constant updating? When

KEY CONSIDERATIONS YOU SHOULD KEEP IN MIND AS YOU MAKE YOUR DFE DECISION

- Performance
- Workflow automation and end-to-end integration
- DFE integration with business systems
- Need for variable data, today and in the future
- How critical color quality is to your customers
- Employee skill level and training

acquiring a new digital press, it's also a good time to revisit the state of the industry in terms of print software. Do you want to be in the software development business? Is there a DFE with a workflow solution that could replace all or part of your homegrown systems for a more efficient operation — with someone else taking responsibility for maintenance? Can you take touch points and the potential for error out of the process by eliminating manual steps? Would new systems allow you to get more done with your existing resources? Can the DFE vendor provide connectivity to your existing systems through industry-standard JDF or their own APIs?

Things are moving fast in the world of print software, and you may be surprised by what you find when you do this type of homework. One in-plant manager we spoke with was in the process of adding new digital presses and a print MIS. A key requirement for him in the DFE decision process was its ability to integrate with the MIS to get them "out of the dumb RIP stage to the streamlined stage of using more of the features a DFE can offer." Assessing how well a DFE "plays with others" is an important part of the DFE decision-making process.

- **Need for variable data, today and in the future**

If you're producing variable data products, how efficient is the process? Could robust variable data processing at the DFE be an advantage for you? If you want to increase your volume of variable data work, keep in mind that while there may be some benefits to preparing everything in prepress and sending print-ready PDFs to production, very large and complex files hitting the RIP can slow down production and affect press utilization. New file formats such as PDF/VT can mitigate this if variable data files are prepared properly to run at the DFE. Since not all DFEs/digital presses support PDF/VT, or other variable data formats such as PPML, VPS and other composition software file formats, be sure to give full consideration to variable data needs when you select a DFE and associated workflow elements.

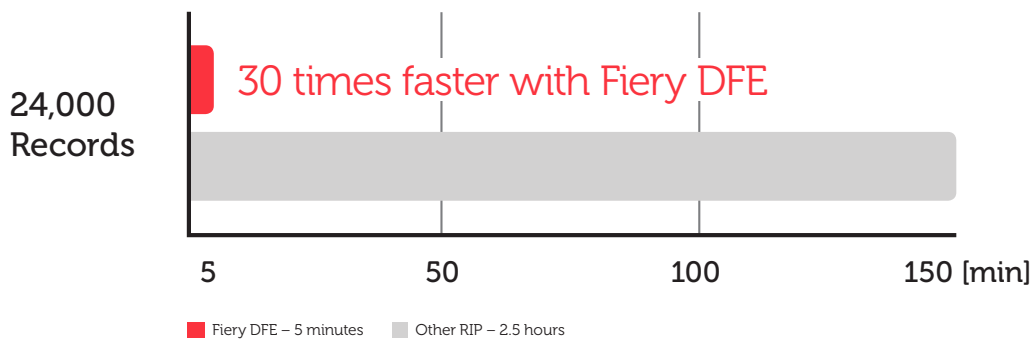
Even if files are prepared using the latest variable data software, processing speed varies widely between DFEs. One shop we spoke with cited a variable data job with 24,000 records that took 2.5 hours to process on one RIP before printing could even start. On another RIP in the shop, they were imaging within five minutes. Both RIPs were driving the same make and model of print engine. The only way to be sure of DFE performance on variable data jobs is to test your jobs before purchasing.

- **How critical color quality is to your customers**

How are you handling profiling and color management? Is there room for improvement? Print buyers are getting more sophisticated, and it's likely that color accuracy will continue to grow in importance, especially if you're displacing offset or producing hybrid offset/digital jobs. If you have a multivendor/multitechnology platform, what processes do you have in place to ensure color consistency across the entire platform? Is your color management software fully integrated into the DFE? Are your press/DFE suppliers in a good position to provide training and/or certifications to comply with customer requirements, or to meet your own internal goals? These are all considerations when adding or upgrading a digital press.

- **Employee skill level and training**

Revisit the skill sets of your employees. Are their current skills able to take the business to the next level? When adding a new digital press, it's also a good time to review staffing. Is more training needed? Is there a certification program that would improve skill levels and overall production? Does it make sense to hire another operator with different skills? It may not make sense to invest in presses and DFEs with advanced capabilities if you don't have the right staff in place.



All of these considerations are important in helping you make DFE and workflow software decisions. They are designed to drive an end-to-end view of workflow. They also include a total cost analysis that goes beyond the cost of the DFE itself to look at the cost savings and productivity enhancements that can be achieved with the right configuration.

Last, but certainly not least, you should consider having someone on your staff who can really dig in, understand all aspects of your workflow, and help you in these types of decision-making processes. This can also help you in implementing solutions that take full advantage of all of the capabilities offered by your DFEs and the other systems that are applicable to your business. This individual (or individuals) should undergo significant training, and even consider gaining certifications rather than trying to teach themselves. In that way, you will be in a better position to make the best possible informed decisions; take full advantage of your investments; and continue to move your operation forward for exceptional performance, happier customers, and motivated employees.

7. Training and certification

Regardless of why or how you make your DFE decision, someone in the organization should take responsibility for being fully trained — and even certified — in the DFE's operation. The press manufacturer can provide training. A third-party DFE manufacturer, such as EFI, may provide training in person or through online courses. Optimum training provides insight into all DFE features as well as in-depth color knowledge, operational best practices, and more.

An additional recommended step is certification. Certification programs, such as EFI's Fiery Professional or Expert certification, ensure that your printing business and staff have the best possible level of knowledge to gain the most from its DFE and other investments. This will help to improve quality, productivity, and throughput for the shop. Training and certification can also be a benefit to overall uptime, since having fully trained staff can often mean faster problem resolution without the need to call on technical field support or other customer support resources. When these resources are needed, fully trained on-board staff can shorten the resolution process by providing more thorough information to technical support.

Training and certification can also give staff a higher level of confidence in their skills, increased job satisfaction, and be offered as part of a career path opportunity.



8. Making the right business decisions

Acquiring or upgrading a digital press is an important decision, as is the choice of the DFE for the press. Both decisions will have long-lasting effects on your business and your bottom line.

To ensure that you get the most out of a digital press investment, take the time to fully examine DFE options. Even if you think your mind is already made up, investing a little extra time in this assessment will help you make the best possible decision for your business. Your investment decision today should enable you to take advantage of the many ongoing innovations in DFE software and workflow that will keep you competitive in the future.

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