Workflow Architectures for Productive Variable Data Printing

Erik Laurijssen
Xeikon International
Lier, Belgium

Abstract Heading

Workflow architectures for variable data printing tend to be complex. This complexity exists because a variable data printing workflow is typically a combination of many separate workflow modules that are linked together in specific loosely or tightly coupled ways. Typical modules in a variable data workflow are: raw data extraction, cleansing and delivery modules, variable data authoring tools, merge engines, digital front-ends, verification tools and interfaces to management information systems and finishing devices.

Choosing the right workflow modules and correctly defining how they interconnect will strongly influence the productivity of the complete variable data printing system. This paper discusses various workflow aspects of variable data printing and indicates how productivity can be measured and improved.

Introduction

Variable data printing (VDP) covers a very broad set of applications. Variable data jobs can range from a few records till over a million and in addition their complexity can vary from simple mail-merge-like capabilities to fully personalized prints. The sheer variety of VDP jobs dictates that there will be no single solution that handles all VDP jobs in the most productive way. This paper focuses on the high-end of the VDP market where productivity is a crucial.

Also the business aspects of the personalized print communication will greatly influence what VDP workflow architecture needs to be chosen. E.g. there is a difference in workflow set-up needed depending on who initiates the communication. One can distinguish two models:. A push-model: the initiative starts from a campaign owner. The print has increased value for the recipient because of its personalization. The print can also draw the attention of the recipient to the campaign's message. Because of the personalization of the print it has a higher chance of triggering a reaction of the recipient. The other possibility is a pull-model: a recipient indicates in some way what information he needs. The VDP workflow assembles the information in a personalized way based upon the recipient requests.

Workflow automation for gaining productivity will be achieved in different ways depending on which of both models is used.

Measuring Productivity

Measuring productivity includes gathering information about the throughput and cost aspects of the VDP system. Both parameters need to be considered.

Measuring throughput is very similar for VDP as for non-VDP jobs as it is more related to the overall set-up of the digital printing system itself. Nevertheless it is more important to measure productivity of a VDP workflow because they tend to be more complex. Therefore gaining insight delivers higher value for subsequent optimizing.

For measuring the throughput of a digital printing system it is necessary to obtain information on how much time is spent on service actions, operator actions, actual printing time, idle time and job preparation time. The actual printing time combined with the speed of the digital press determines throughput productivity. Although very general information about the achievable uptime of a digital printing system is usually available from the printing press vendors, it is very worthwhile to set up procedures to constantly log the state of the digital front-end and the digital printing press. Auditing modules in the digital front-end that is connected to the digital printing press can deliver this information. Through interfaces of the digital front-end this auditing information can be sent to a central management information system (MIS). The centralized information can be used for measuring and analyzing productivity and productivity trends. This productivity dashboard delivers objective data on system uptime, on workflow efficiency and information for better cost analysis, for discovering system bottlenecks, for optimizing system maintenance, for measuring effectiveness of changes, etc. If the MIS system also holds information about the jobs or campaigns themselves and/or the various cost elements of the VDP system, then higher value information can be distilled from the aggregated data yielding better insight in overall cost structures.

Measuring the cost aspects of a VDP job is very different for measuring the cost aspects of a non-VDP job. Next to typical TCOP calculations specific VDP related costs include costs associated with transferring, cleansing and handling raw data, costs of variable data authoring tools, costs of verification and auditing tools, costs of significantly more complex design and layout work, and automation costs. A VDP workflow typically benefits from automation. Costs for setting up this

automated workflow need to be taken into account as well.

Keeping track of and calculating the cost of a VDP campaign and its selling value is a complex but important issue for print providers and ad agencies.

Impact of Workflow on Productivity

The workflow architecture and its constituting modules are responsible for the job preparation time. For VDP jobs the job preparation time is typically considerably longer and more complex then for non-VDP jobs. Therefor, in addition to general productivity improvement techniques, the goal of a productive VDP workflow is to minimize the job preparation time and thus yield more time available for printing. Ideally the workflow ensures that incoming data can be processed faster than the rated print engine speed so the digital printing press will not have to slow down or wait for RIP-ed or ready-to-print data.

Raw data gathering, cleansing and storage is an important aspect of VDP jobs. It requires specific skills and tools that traditionally were not part of the print provider or ad agency skill sets.

VDP authoring tools and merge engines come in many sizes and flavors. A merge engine is a workflow component that merges the raw data with the design and layout information based on predefined rules. This task can be performed in the authoring tool itself, as a stand-alone component or in the digital front-end. Choices of tools and set-ups need to be made based upon on the parameters coming from the VDP business model.

Another reason why the job preparation time is an important factor for VDP jobs is that for VDP jobs every instance of a document is unique and all the composing elements of every document instance need to go through the RIP at some point. Various RIP optimization schemes exist for processing VDP jobs but nonetheless the RIP becomes a prominent factor compared to non-VDP jobs. Probably the most important feature of a productive workflow is that it allows highly automated print runs. Automation makes sure more jobs can be processed faster with minimal human intervention and thus enhancing repeatability and reducing human errors in the printing process. The existing and rising focus on web services, internet-based applications, powerful back-office systems and more and more automation tools will further enable automated production printing. Modular workflow building blocks with open and standard interfaces are emerging. They will be capable of creating many productive workflow architectures tuned for specific VDP campaigns or VDP business models.

Another feature of a productive workflow is to have efficient verification and recovery functionality. Whenever printer problems occur it is important that these can be detected automatically and that the printed output is (as much as possible) verified against its expected output. An important remark is that single-pass duplex printing presses can ensure higher levels of front to back data integrity.

Adding sufficient auditing capabilities and links with MIS systems throughout the complete workflow allows to make closed-loop processes that guarantee high levels of automation and quality and which can be extended to include automated order intake, invoicing and delivery.

The TCOP Perspective

Calculating the Total Cost of a Printed Page is a taunting task. It combines taking into account the costs of the initial capital investments of the digital printing system, the recurring costs of consumables, paper, operators, service contracts and many more factors. VDP makes this calculation even more complicated because also the infrastructure for handling variable data jobs needs to be taken into account as mentioned earlier in this paper.

It appears that, although important, the role of TCOP as the main component in defining the selling prices of VDP campaigns is diminishing. As the personalized print communications market matures print providers or ad agencies become more successful in selling the actual value of personalized communication. Setting up VDP campaigns includes more and more specific VDP-related marketing savvy and technical know-how. Thus, defining and implementing the right productive workflow architecture to support specific VDP campaigns becomes an important competitive factor that can be valorized in addition to TCOP based margin calculations. Increased effectiveness of VDP campaigns will offset the higher selling prices of VDP printing. Also, adding value-added services decreases the role of the cost of print. These services hold the potential of locking in a client by holding and managing its data and generating recurrent revenues.

Next to the previous observations PODi reported that in many cases the realized cost per delivered document becomes more important then the actual TCOP. A productive VDP workflow enables printing only the information that is relevant for a specific recipient or only print for recipient that show interest in specific information. This means that in certain cases one can look at the savings of not having to print everything for all recipients.

Conclusion

There is no single answer to the question of what a productive variable data printing workflow is. The main feature of a productive workflow is that it needs to be tuned towards the VDP campaigns it is required to run efficiently.

In general most productive VDP workflows share the same basic ideas. Late binding of raw data with the design and layout information delivers more flexibility. RIP optimization schemes can significantly reduce job preparation times and improve productivity. Workflow automation can help lower costs significantly. Verification and recovery tools enable high levels of automation. Adding auditing capabilities helps monitoring throughput and costs and helps automating order intake and invoicing. And, modularity and open interfaces of workflow modules guarantee flexibility in tuning a workflow for specific VDP campaigns.

Figuring out what VDP workflow to set up is a complex task. Print providers should discuss with digital print engine vendors the openness and modularity of

their offerings and the adherence of the vendors products to open standards like (e.g.) PPML or PPML/VDX for variable data printing. In addition integration services or solution selling of digital printing equipment becomes increasingly a necessity.

Biography

Erik Laurijssen is Vice President, Front-End Systems Group, at Xeikon International. After obtaining a Masters degree in engineering from the University of Leuven, Belgium, he has built up 14 years of experience in leading international businesses that develop, support, market and distribute complex high-end software products. The last 4 years he has been leading the Front-End Systems group of Xeikon International.