JDF Process Automation Case Study

LV Druck GmbH & Co. KG
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48165 Münster
Germany
Executive Summary —
Landwirtschaftsverlag was founded in 1946 and is headquartered in Münster-Hiltrup. We are Europe’s leading agricultural publisher and are active in Germany, Austria, Switzerland, Poland, and the U.K. In 2008, the Group generated sales in the order of EUR 75 million with approximately 470 employees inside and outside Germany.

In 1949, when the publishing company was still in its infancy, a printshop was added. Until the mid-1970s, letterpress printing was the only printing process used. At the end of this decade, the printshop equipment was gradually switched over to offset printing. Production initially took place on one- and two-color presses. In the 1980s, we moved over to presses that were capable of printing up to four colors in a single pass. In the spring of 2006, we employed a workforce of 45 and mainly produced magazines, brochures, calendars and posters, generating sales of around EUR 8 million.

While our publishing arm responded to competition in the media industry with holdings and cooperation arrangements in Germany and beyond, the printshop kept on expanding its production facilities to hold its own on the fiercely competitive commercial printing market. This steady growth, coupled with the necessity to react ever faster to growing customer demands, ultimately led us to consider hiving off the printshop as an independent company.

We came to the conclusion that it was impossible to develop the business models of the publishing company and printshop in parallel in the long term, and in 2007 we founded LV Druck GmbH & Co. KG as an independent business wholly owned by the publishing company. The new enterprise needed to prove that printing was a field of business that could enjoy continued profitable development under free market conditions.

In addition to ensuring growth in our core business and moving into new strategic fields of business, the key objective was to boost efficiency in production.

We have always set great store by robust and reliable equipment. Most of our jobs are printed on Heidelberg presses. At the time the printshop was hived off, it had two large presses, both from Heidelberg – a Speedmaster CD102 five-color press with coating unit and a Speedmaster CD102 four-color press, which was replaced with a Speedmaster CD102-4+L in 2008.

There was a need to optimize prepress operations, which had been identified as a problem area prior to the spin-off. The existing CtP workflow was proving to be increasingly error-prone and inflexible, and it was not possible to automate repeat operations. JDF had demonstrated that automation between the MIS and production system was also possible. When deciding on a replacement investment, it was therefore clear that only a JDF-based system could integrate the individual production sections and meet the various order processing and administrative requirements. The future solution was to be integrated with the Prinance MIS that alphagraph supplied in 2001.
Following an objective system comparison by the project team, the Prinect Printready prepress workflow from Heidelberger Druckmaschinen was installed in spring 2007. This quickly led to the expected shorter throughput times, dispensed with the need for manual interventions in the data flow, and reduced the number of errors.

Instead of entering job descriptions twice – once in the order processing department and once in prepress – the JDF data from Prinance has been used to automate plate production since the introduction of the Prinect workflow. From the outset, particularly significant savings were made with repeat jobs and periodicals because we were able to benefit from automatic access to complete JDF layouts. New products were given JDF stripping parameters in Prinance, which were added to in prepress. Since 2009, this subsequent step has also become superfluous thanks to the Prinance Signa Planner module. This module enables complete JDF layouts to be created.

At the beginning of 2009, LV Druck bucked the current trend by expanding its production facilities in its core business of printing by adding a new Speedmaster XL 75-6+LYYL for specialty products made of paper and plastic, and a workflow module for lenticular effects.

The way business has developed to date and above-average growth in sales in the initial years of independence demonstrate that our subsidiary is on the right track. Sales have now passed the EUR 10 million mark and the printshop has over 80 employees.
Section I. Background — Prior to JDF implementation, there were six employees in prepress working in 1½ shifts. A CtP workflow from Fuji had been in use since 2000. Data was checked manually, in some cases with different tools used in different ways. The workflow comprised a large number of consecutive manual steps and it was not possible to automate repeat operations.

The Prinance industry software was already installed at this point, but not integrated. The job ticket reached production in the conventional way. We used tools developed in-house such as special folding samples or manual sheet layouts in Excel to show how sheets were divided up. Each imposition layout had to be created or processed manually using the Preps imposition software.

In the course of 2006, we found the existing system to be increasingly error-prone. The number of imaging errors rose to levels as high as 30 percent. Every single printing plate had to be checked for errors in the proofreading section.

Fig. 1: The workflow prior to JDF implementation.
Section II. Objectives — The problems had been identified. The prepress workflow needed to become faster, more reliable, and more cost-effective. The switch from PostScript to PDF processing technology meant that the only way forward was to replace the existing system. The new workflow was to be integrated with the Prinance MIS supplied by alphagraph, which had been in use since 2001, in order to optimize coordination between the order processing and production departments. Given that JDF had become the standard format for exchanging management and production data, the replacement investment had to be a JDF-based system.

The solution needed to ensure:

- straightforward, standardized operation with minimal administrative work
- a highly reliable system
- centralized JDF management
- modularity, scalability, and upgradability at any time in the future
- an extremely secure investment.

The need for process automation was particularly important in view of the fact that the new company was about to be created. The primary objective was to successfully establish the printshop under free market conditions. The aims of JDF integration were in line with the new strategic orientation and the new corporate goals:

- utilizing innovative production technology
- minimizing the throughput time for jobs
- improving product quality.

Section III. Methodology — Having identified the prepress problems in the course of 2006, we started the evaluation process for a new prepress workflow in October 2006. An internal project team compared the performance data for the systems available on the market – from Fuji, Heidelberg, AGFA, and CREO. The manufacturers then provided us with workflow demonstrations.

The factors that led us to choose Heidelberg were:

- appropriate system performance data
- impressive product demonstration
- impressive service portfolio
- solution provider for prepress, press, and postpress
- link to existing Prinance MIS
- JDF expertise.

Opting for the new JDF workflow was the first step towards integrated production!

Section IV. Implementation Story — In January 2007, we signed the contract with Heidelberg for the new prepress equipment, including a Suprasetter S 105 with SignaStation and MetaDimension and a EUR 15,000 service package for training, JDF integration, and production supervision.

To prepare for the system changeover, there was a joint workshop in March 2007 involving the people responsible at our company and system consultants from Heidelberg. The aim of this workshop was to document the existing situation in all the printshop’s administrative and production departments, and to analyze how they worked together. The activities of the individual sections, the tools required, and their “supply relationships” were recorded in the form of input-output flip charts.
The advantage of this documentation was that it provided everyone involved with an overview of the complete workflow and thus of the activities of each of the other sections. This provided a sound basis for discussing the potential for optimization and enabled informed decisions on changes to be made. For example, the workflow analysis revealed that installing the new platesetter in a different room would have major advantages in terms of supplying the presses with plates.

Another aim of the first workshop was to determine how to proceed with the project. Heidelberg presented a detailed schedule for workflow/platesetter installation and staff training. Our task was to appoint an internal project manager to take overall charge of the system changeover. Our expectations relating to project progress were only met once an employee without any other day-to-day responsibilities took over internal project management later on in the JDF implementation process.

To prepare for installation, an IT infrastructure analysis was performed by a network engineer from Heidelberg and administrative staff from our IT department in March 2007. The purpose of this analysis was to document the company’s entire IT infrastructure. We were determined not to ignore the fact that efficient and reliable IT components are essential for successful integrated production. The results of the analysis provided a sound basis for subsequent infrastructure planning. Cost considerations also meant that it made sense to migrate all printshop systems to an IT infrastructure that was independent of the publishing company and geared to the specific production needs of a printshop. In the space of a single day, all rooms (in particular IT rooms), servers, and workstation terminals together with the installed software (operating system, applications, and internal/external communication services) were incorporated in the system. Network components (cables, switches, etc.), network protocols and network loads were analyzed with the help of network scans.
Installation of the new prepress system, including a Suprasetter S 105 and Printready with SignaStation, was completed in April 2007. A further workshop held in the same month focused exclusively on the JDF integration of Prinance and Printready. The aim of this workshop was to use JDF to optimize cooperation between the order processing and prepress departments. In the run-up to the workshop, a test job was passed through the system and evaluated. The exchange of job data between Prinance and Printready worked immediately – the job with its costed product components was entered in the workflow and it was possible to provide Printready with an HTML view of the printed job ticket using JDF and open this at any Prinect Cockpit. A group sequence (process schedule) was automatically assigned as the standard processing sequence in Printready. This controlled all consecutive processing steps for the PDF data. Automatic feedback on plate imaging and proofs can be used in Prinace for status messages or actual costing.

Given that it was possible to transfer JDF stripping parameters, the possibility of transferring the entire impositioning process to the order processing department was discussed at this workshop. However, this was shown not to be possible due to product definition limitations in Prinance:

- The definition of horizontal and vertical intermediate cuts is only possible to a limited extent.
- It is not possible to indicate the sheet sequence.
- No sample pages can be defined (e.g. page shortening).
- It is not possible to influence the positioning of marks.
- Mixed forms within a single job are only possible to a very limited extent.

Depending on the job, the amount of communication with SignaStation and the subsequent steps required there may be such that no benefits over the previous process can be expected. The only way to overcome this limitation would be to set up a Signa workstation – i.e. a PC with Printready Cockpit and Signa license – directly in the order processing department. This would, to all intents and purposes, be equivalent to merging the order processing and prepress departments – a step that has not been taken to date.

Instead, it was decided to make active use of the JDF function for exchanging the reference to the previous job for periodicals and repeat jobs. If the order processing department so wishes, complete layouts and processing sequences are loaded into Printready using the Printready function “Introduce related job”. This represents genuine process automation for 20 percent of such jobs – thanks to JDF!

![Function 'Introduce related job']

At the end of April 2007, the printshop was officially hived off as an independent company trading under the name LV Druck GmbH & Co. KG. Since this time, Stefan Klinksiek has been running the company in the role of Managing Director. LV Druck also took over sole responsibility for the integration project. The split from our publishing company initially made
the employees affected feel very insecure. A new sense of self-worth, changes for the better, and respect for what has been achieved were the subsequent triggers for staff motivation – a key factor in profitability.

At drupa 2008, alphagraph exhibited the Prinance impositioning function and pledged that all JDF-enabled prepress workflows would deliver maximum support for the automated production workflow. Testing of Signa Planner started at LV Druck in May 2009 and this has shown that it overcomes the layout definition limitations encountered in 2007. The system will start operation proper in June.

Section V. Resulting Workflow/Processes — Installing Signa Planner in the order processing department in May 2009 has overcome the layout definition limitations in Prinance encountered at the start of the integration process. The Signa Planner developed in cooperation with Heidelberg is a special version of SignaStation that is launched directly from Prinance and communicates with the MIS in a JDF workflow. Data that the order processing department needs for costing – such as page count, paper format, type of binding, etc. – is transferred to the Signa Planner at the touch of a button.

![Fig. 4: Prinance screen with Signa Planner integration](image)

The Signa Planner wizard opens in a separate window and takes the operator through the various steps involved in layout definition. The data from Prinance is already entered in the relevant fields and can be corrected or added to, for example in the case of special sample pages or trims.
Given that the various printers’ marks are added in the Signa Planner, too, it is also possible to intervene here, for example if the color bar is to be located in a particular position. The system is configured in such a way that the same resources can be used for folding layouts and plate planning templates as in Printready (new name: Prinect Prepress Manager).

If the JDF is written in Prinance, the production workflow can be automated as far as the sheet proof or even beyond. In Prepress Manager, predefined sequences (process schedules) control consecutive processing steps such as data checking, page processing, and plate output. A JDF layout from the Signa Planner no longer needs to be opened, but can immediately be filled with PDF pages. This eliminates manual interventions and significantly improves reliability in production. Although the headcount at the company as a whole has risen, the number of prepress staff has fallen. There are currently three members of staff and one apprentice working in 1½ shifts.
Theoretically speaking, it is possible to automate all jobs that can be costed in Prinance. In practice, however, not all processing staff are capable of creating a perfect layout using the Signa Planner.

LV Druck also has jobs that can only be depicted in Prinance using “workarounds” (e.g. mixed forms). This results in the following job categories:

<table>
<thead>
<tr>
<th>Level of automation</th>
<th>Type</th>
<th>Proportion of jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Periodicals etc.</td>
<td>20%</td>
</tr>
<tr>
<td>Partial (with monitoring)</td>
<td>Individual standard jobs</td>
<td>50%</td>
</tr>
<tr>
<td>None</td>
<td>Mixed forms etc.</td>
<td>30%</td>
</tr>
</tbody>
</table>

We are endeavoring to reduce the number of products that cannot be automated in favor of those that enable a high level of automation or at least partial automation. There are regular feedback meetings between the various departments relating to this production standardization.

Fig. 6: The LV Druck workflow following JDF implementation.
The Prinance JDF connection enables all prepress activities that were previously performed manually to be automated:

- Incorrect multiple entries are avoided through automatic job creation in the workflow system and the job definition contained in JDF.
- Defining the sheet layout in Prinance/Signa Planner completely eliminates the need to generate the layout sheet separately in prepress.
- Similar jobs can be loaded directly from the Prinect JDF memory – in whole or in part.

Savings are also made during costing in the order processing department:

- Data required for costing – such as page count, paper format, type of binding, etc. –is adopted for the JDF layout.
- Separate tools such as folding samples, manual sheet layouts, etc. can be dispensed with entirely at the job description stage.

Fig. 7: Lenticular software

One particular highlight is the integration of innovative lenticular software. With this workflow enhancement it is possible to create printing forms for lenticular products (prints with stereo or 3D effects). The screen dots on the printing plate need to be matched precisely to the prisms of the lenticular film. With the help of Heidelberger Druckmaschinen we were able to produce our first high-quality lenticular products within a matter of days on the new Speedmaster XL 75-6+LYYL-F.

Based on the success of JDF integration in prepress, we are planning to extend this to the pressroom before the year is out. Although all our presses have been linked to prepress via PPF/CIP3 since 2004, we are expecting further rationalization with JDF. In future, for example, it may be possible to depict the entire planning process in the production workflow.
Section VI. Optional Detail — Improvements and savings achieved through JDF integration

In the years following JDF integration, it has been possible to improve productivity and the quality of LV Druck products. This has been reflected in the higher sales figures and the smaller number of customer complaints.

The increase in productivity is evident from the higher sales and the number of jobs processed. We estimate that process automation and the associated reorganization of the order processing and prepress departments account for around 40 percent of this increase. For the start-up phase in the first year, only 50 percent of the effect was factored into the calculation. Based on the way business developed in the years 2007 to 2008, we predict that sales will continue to grow, though at a 25 percent slower rate.

Despite the increase in the number of jobs processed, the number of plates used has fallen by 5,000 to the current level of 18,000! This apparent contradiction is a result of the dramatic decrease in imaging faults, which has been included in the calculation under “Savings in material consumption”. In addition, LV Druck was able to downsize its prepress team by 1½ prepress employees and a proofreader following JDF integration. Prior to integration, every plate had to be inspected closely before being fitted in the press. The staff affected have been reassigned to other production areas at the printshop. Although the proofreading stage has been dispensed with, the proportion of errors resulting in downtime that are only identified when setting up the press has remained unchanged. For 2007, we have only included 50 percent of the relevant saving because it was not achieved immediately during the start-up phase. The number of processing staff remained the same.

The reduction in the number of customer complaints has saved the company some EUR 100,000. 25 percent of improvements can be put down to optimizations achieved through JDF integration.

Costs of JDF integration

The costs of purchasing software and hardware for prepress integration and the ongoing update costs have been included in the calculation. Given that the prepress department already had a CtP platesetter with an output of 25 plates/hour, the Suprasetter S 105 with an output of 19 plates/hour has been treated as a technology upgrade and 30 percent of the total investment cost has been included in the calculation.

In order to make the best possible progress with internal process optimization, LV Druck created the post of ‘Hardware and Software Administrator’ in 2007. The member of staff entrusted with this task used to work in the order processing department and was also responsible for JDF integration. The costs for this employee have been included on a pro rata basis according to the proportion of time spent on the project in calendar years 2007 to 2009 (30 percent of his time).
LV Druck calculation for CIPPI Awards 2009

<table>
<thead>
<tr>
<th>Periods</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discount rate</td>
<td>6%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discount factor</td>
<td>0.9434</td>
<td>0.8900</td>
<td>0.8396</td>
<td>0.7921</td>
<td>0.7473</td>
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<td><strong>Benefits and savings</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Increase in turnover</td>
<td>206,300.00</td>
<td>412,600.00</td>
<td>412,600.00</td>
<td>309,450.00</td>
<td>206,300.00</td>
</tr>
<tr>
<td>Headcount reduction in Prepress Department</td>
<td>75,000.00</td>
<td>150,000.00</td>
<td>150,000.00</td>
<td>150,000.00</td>
<td>150,000.00</td>
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<tr>
<td>Savings in material consumption</td>
<td>20,162.45</td>
<td>40,324.90</td>
<td>40,324.90</td>
<td>40,324.90</td>
<td>40,324.90</td>
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<tr>
<td>Improvements in quality</td>
<td>12,342.50</td>
<td>24,685.00</td>
<td>24,685.00</td>
<td>24,685.00</td>
<td>24,685.00</td>
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<tr>
<td><strong>Total annual savings</strong></td>
<td>313,804.95</td>
<td>627,609.90</td>
<td>627,609.90</td>
<td>524,459.90</td>
<td>421,309.90</td>
</tr>
<tr>
<td><strong>Cumulative savings</strong></td>
<td>313,804.95</td>
<td>941,414.85</td>
<td>1,569,024.74</td>
<td>2,093,484.64</td>
<td>2,514,794.54</td>
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<tr>
<td><strong>Discounted annual savings</strong></td>
<td>296,042.40</td>
<td>558,570.57</td>
<td>526,953.37</td>
<td>415,421.36</td>
<td>314,827.26</td>
</tr>
<tr>
<td><strong>Total investment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>External investment (products)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prinancce</td>
<td>6,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preprint ready migration</td>
<td>90,000.00</td>
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<tr>
<td>Technology upgrade Suprasetter</td>
<td>90,000.00</td>
<td></td>
<td></td>
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<tr>
<td>Training</td>
<td>15,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT infrastructure analysis</td>
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<td><strong>Internal investment</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal training</td>
<td>6,000.00</td>
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<td></td>
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<tr>
<td>Internal project management</td>
<td>18,000.00</td>
<td>18,000.00</td>
<td>18,000.00</td>
<td>3,000.00</td>
<td>3,000.00</td>
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<tr>
<td>Service costs</td>
<td>9,600.00</td>
<td>9,600.00</td>
<td>9,600.00</td>
<td>9,600.00</td>
<td>9,600.00</td>
</tr>
<tr>
<td><strong>Total annual costs</strong></td>
<td>210,000.00</td>
<td>18,000.00</td>
<td>27,600.00</td>
<td>27,600.00</td>
<td>12,600.00</td>
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<tr>
<td><strong>Cumulative costs</strong></td>
<td>210,000.00</td>
<td>228,000.00</td>
<td>255,600.00</td>
<td>283,200.00</td>
<td>295,800.00</td>
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<td><strong>Discounted costs</strong></td>
<td>210,000.00</td>
<td>16,981.13</td>
<td>24,563.90</td>
<td>23,173.49</td>
<td>9,980.38</td>
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<tr>
<td><strong>Net benefit (annually) (=2-5)</strong></td>
<td>-210,000.00</td>
<td>295,804.95</td>
<td>600,009.90</td>
<td>600,009.90</td>
<td>511,859.90</td>
</tr>
<tr>
<td><strong>Cumulative net benefit</strong></td>
<td>-210,000.00</td>
<td>85,804.95</td>
<td>685,814.85</td>
<td>1,285,824.74</td>
<td>1,797,684.64</td>
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<td><strong>Discounted net benefit</strong></td>
<td>-210,000.00</td>
<td>279,061.27</td>
<td>534,006.67</td>
<td>503,779.88</td>
<td>405,440.98</td>
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<tr>
<td><strong>NPV (Net Present Value) in €</strong></td>
<td>1,817,700.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>ROI (Return on Investment) in %</strong></td>
<td>865.57</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section VI. Optional Detail —

Dear Mr. Klinksiek,

In most cases, suppliers receive no customer feedback following the successful completion of a print job. However, given that the lenticular products you recently supplied met with such a positive response – both here at the agency and with our customers – we would like to make an exception in this case.

The results you achieved are extremely impressive and we would like to congratulate you and say a big thank you.

Despite our tight timeframe, the jobs were completed on time and with great professionalism. In close consultation with our agency, you created innovative products that have brought an unusually high number of positive responses from our customers. As an advertising agency, this is very flattering for us and makes us certain that we have found the ideal service provider.

We are extremely satisfied with your company in every respect and look forward to working with you again on exciting new projects in the future.

Kind regards,

Matthias Windolph
Sehr geehrter Herr Klinkiek,

meistens bekommt man als Lieferant nach erfolgreicher Abwicklung eines Druckproduktes kein Feedback vom Kunden. Da Ihre letzten für unsere Agentur produzierten Lenticular-Produkte jedoch bei uns als auch bei unseren Kunden gleichermaßen so gut angekommen sind, möchten wir hier gerne eine Ausnahme machen.

Ihre Ergebnisse sind begeisternd. Hierfür ein dickes Lob und ein großes Dankeschön.

Trotz unserer engen Zeitvorgaben wurden die Aufträge in ihrem Haus professionell und termingerecht abgewickelt und so entstanden in enger Abstimmung mit unserer Agentur neuartige Produkte, die bei unseren Kunden ungewöhnlich viele positive Reaktionen auslösten die uns als Werbeagentur schmeicheln und uns die Gewissheit verliehen, hier genau auf den richtigen Dienstleister gesetzt zu haben.

Wir sind mit Ihrem Haus in jeder Hinsicht sehr zufrieden und freuen uns auf weitere spannende Projekte mit Ihnen.

Mit freundlichen Grüßen

Matthias Windolph