JDF Case Study
Imprimeries Didier Quebecor

Abstract

- Major Web printer that implemented JDF connectivity between MIS and Prepress department.
- To date, Imprimerie Didier Quebecor (IDQ), an entity of Quebecor World France:
  - 3 Gravure presses,
  - 8 Offset presses,
  - 5 shifts operations (24/24, 7/7, 364 days / year),
  - 224 000 tons of printed paper (56% from gravure, 44% from offset).
- In late October 2006, the decision was made to proceed with the upgrade of the prepress system, for the offset department. This upgrade allowed IDQ to implement a JDF interface with the new :ApogeeX Imager product from Agfa which was fully JDF enabled. This implementation opens the way to process standardization at the Offset department; which is call too the “FiO department”.
  The main goals were:
  - To link the MIS system to the prepress system, in order to reduce the amount of wasted time,
  - To optimize the pre-press department processes, with JDF as core system.
- In June 2007, after 6 months of development, the project was fulfilled, and the interface up and running.
- ROI resume
  - The project has identified a ROI of 6 months.
- After 6 months of production with the new systems, we are very confident for the future. The technical objectives have been achieved, and some last evolutions need to be integrated, in order to achieve our financial objectives. The new organization is able to handle the workload and has increased its controls.
**Corporate profile**

**Your Complete Print Solutions Partner.**

From developing your creative concepts up to delivering the final product to your customers, Quebecor World is the global leader in providing innovative and superior-value printed products and services. Our global capacity and geographic reach allows our customers to expand their business into new markets and print closer to the end user. Combined with our pledge to employ the best people, executing their skills on the latest technology, our customers are assured to receive the highest possible value for their communication budgets. It's the Quebecor World Commitment.

**Company Profile**

Imprimerie Didier Quebecor (IDQ) is the largest commercial printer in France with both rotogravure and offset capabilities. The Mary-sur-Marne plant is one of the most modern in the world.

Imprimerie Didier-Quebecor is able to produce very high volumes of work. The company is characterized by state-of-the-art presses.

<table>
<thead>
<tr>
<th>Gravure figures for 2007</th>
<th>Offset figures for 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engraved cylinders</td>
<td>8 000</td>
</tr>
<tr>
<td>Pages</td>
<td>80 000</td>
</tr>
<tr>
<td>Ink weight</td>
<td>4 800</td>
</tr>
<tr>
<td>Printed Paper weight in tons</td>
<td>127 000</td>
</tr>
<tr>
<td>Number of Plates (Komori)</td>
<td>110 000</td>
</tr>
<tr>
<td>Number of plates (Sunday)</td>
<td>31 000</td>
</tr>
<tr>
<td>Ink weight</td>
<td>2 540</td>
</tr>
<tr>
<td>Printed Paper weight in tons</td>
<td>97 000</td>
</tr>
</tbody>
</table>

Fig 1 : Main offices and an overall view of the plant
Perimeter

As a worldwide leader in commercial printing, Quebecor World has built a strong relationship with its premium suppliers, in order to leverage the business and the process automation.

This evolution is progressive inside our group and the JDF was a key factor in process automation. In fact, this norm will improve all the processes and the communication between systems. And QW has decided to implement a pilot project, in order to demonstrate this point of view before deployment anywhere else.

The main goal with the first JDF implementation at QW was to automate the relationship between the MIS system and the prepress system. Before implementation, no exchange existed between those 2 worlds, except physical document exchange with oral or written instructions. Our objective was to link those 2 worlds using JDF in order to automate and to simplify the relationship. This concept has to be proven for the 2 printing systems: Offset & Gravure. In fact, in our case, we use 2 different pre-press systems (DALIM & HELL for gravure, and AGFA & KODAK for offset).

As the decision was made in late 2006, the upgrade of the :ApogeeX system to the latest version, will leverage the offset prepress organization. This perimeter was the first one to test the JDF implementation. Gravure experience will come later, due to some delay in JDF compliant software delivery by the editor.

Prior to implementation

MIS Overview

QWF has decided in 2000, after several software trials, to develop its own software in order to manage its core products. This project, called PYRAMIDE, was a project that needed to leverage all existing processes, by sharing an important number of references, that were previously split between different systems.

The main idea of PYRAMIDE was to consolidate all the data, into one database, and to propose access to those data through a web interface. During 5 years, we setup progressively different modules, like production orders, customer references, customer credit analysis, logistics ….

This system is a full web application, that has grown under our control. It’s by nature not JDF compliant, but could easily be upgrade in order to send and receive XML files. As an example, the system was upgraded during 2007 in order to be PAPINET compliant. As requested by some customers, this upgrade allowed IDQ to exchange the paper consumption figures with PAPINET messages.
Interaction between MIS and the FiO prepress department

The MIS provides a way to fully describe the job that will be printed on the presses. Here is the major screen description of the production order module:

Fig 2: Overall description of the production (customers, contacts, planning, comments …)

Fig 3: Description of the job signatures (name, number of pages, process, folios …)
Before the JDF integration, the producer - who is a member of the Customer Service department - was responsible for the job. He created the necessary (paper) job bag, inserted a printout of the job description from PYRAMIDE, incl. all other relevant production information such as Preps (imposition) forms to be used, etc. This job bag was manually handed over to the prepress department where an operator would have to read from the job bag data, and copy relevant production information into the prepress system.

So as you might understand, the job data exchange was a manual one, with all its inherited inconveniences such as:

- Time consuming due to retyping and understanding of the instructions,
- Risks of errors and misunderstandings,
- …

**Offset Pre-Press department**

**Organization of the Offset prepress department**

The previous organization of the offset pre-press department was the following:

- 1 Manager,
- 5 Controllers (1 controller per team),
- 27 Operators divided over following shifts (morning, afternoon, night or Week End),
- 3 output managers,
- 3 Archive managers,
- 2 plates holders.

**Input received by the department**

The operators receives from:

- one side the files from customers (generally through the FTP and the MASS TRANSIT system managed the QWF),
- the other side, the folder from the producer, showing the description of the job, and a schema that should help him to setup the plate forms.

**Output from the department**

The department delivers to the presses:

- the plates corresponding to the job, using the right forms,
- the normalized proofs if needed, or the customer proofs for color management,
- the ink parameters using CIP3 format.
Operations managed by the prepress department

List of chronological operations that were under control by the operators:

1. Reading and understanding the job description, provided through the job bag, and previously created by the producer,
2. Delivery check of customer files with the transmission tools available,
3. Control of each file in order to verify they are compliant,
4. Treatment of each file by the RIP,
5. Creation of the forms with PREPS,
6. Creation, in the prepress software, of a job ticket that contains plate formats, forms, where to find the files …
7. Delivery and control of the forms through an imposition,
8. Creation of the plates and manipulation between the different CTP phases,
9. Punch of the plates,
10. Controls of the plates,
11. Delivery of the CIP3 information for ink management,
12. Delivery of all elements that must go to the press on one stacker.

It is important to retain that the pre-press operator is like a “Opera Conductor”, because he is responsible of launching the right task at the right time. And as you can see, there are lots of tasks to manage, and for a major part of them non value added tasks.

Fig : 4 : Overall interaction between MIS & Prepress
Objectives —

As a leader, we are daily involved in the standardizing our production processes. This has a wide impact on all our processes, such as:

- process management (ISO),
- paper management (FSC, PEFC),
- environmental purpose,
- Prepress.

As described below, we thought that JDF could enhance our processes, and the main goal of our project was to use JDF in order to redefine the organization of the prepress department. Our key partner AGFA and QW decided to go further with JDF and to share some goals such as:

- Setting up the first French JDF interface between MIS & Prepress systems,
- Designing a new technical organizational where the system is compared to grey box, and JDF is used as a communication protocol which could be considered as a backbone.

![Diagram](image)

**Fig 5:** Overall technical organization

This last concept is very convenient for all those who are involved in these processes:

- it simplifies the support of the systems, because each grey box could be resumed as an input and an output,
- it allows you to simply clone the architecture very easily,
- it simplifies the process, the controls and the day to day life around it,
- …
We can add to those global goals, where the ROI are difficult to estimate, other goals, which were identified by IDQ and where it’s easy to identify ROI:

- Getting accurate with less operator interventions,
- Reducing time and labour in prepress,
- Increasing efficiency and automation,
- Masking the complexity of the prepress systems and simplifying their use.

Schema of the global project:

Fig 6: Overview of the project
Methodology

Methodology

About the overall methodology of this project, it is important to notice, that there has been a complete audit of the FiO department, in order to validate the processes in use, and the operators habits. This audit was very helpful in estimating the best solutions for the department.

The audit consists in a deep review of:

- The organization and the profiles of each employee of the department,
- The processes and systems in use,
- The tasks that could be easily automated,
- The tasks that were redundant between the producer and the pre-press operator.

Major Systems choices:

About the choices that were available to the project team, there were provider to find for:

- The prepress software system,
- The CTP system,
- The infrastructure that automates the transport of the plate between the different steps (CTP to the four, via the online punching system and then the stacker),
- The JDF software.

In our organization, the prepress is considered as a business critical system, and choices are made at a corporate level. So for the Offset department, the key decisions were:

- SOFTWARE : AGFA :ApogeeX Imager V3.5, and the full implementation of JDF,
- CTP : CREO Systems,
- Plate transportation : NELA.
JDF choices

One of the most important choice that has to be made in step 2 was to decide the way we would have to handle the outbound JDF from our MIS System. This system is a fully home made software that has been setup 6 years ago, and included all the needed modules for a printer. It doesn’t natively support the JDF. So, we had to decide between several approaches:

- JDF Only: Interface with the generation of a JDF file from the MIS to the prepress system that treats it,
- JDF / JMF (Version 1): Interaction between the MIS and the Prepress system, and internally developing,
- JDF/ JMF (Version 2): Same as version 1, but based on a framework software, available on the market.

Here are some comparisons that have been done in 2006 in order to help the choice for the project team:

<table>
<thead>
<tr>
<th></th>
<th>JDF Only</th>
<th>JDF / JMF (v1)</th>
<th>JDF / JMF (v2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pros</td>
<td>Easy to provide a JDF file</td>
<td>Allows a Two way communication (question/response model)</td>
<td>Allows a Two way communication (question/response model)</td>
</tr>
<tr>
<td>Cons</td>
<td>Without JMF, the communication is one way only</td>
<td>Complex to deploy in our environment</td>
<td>Need an extra software that will manage all JDF/JMF flows between systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The MIS should have to send JDF files, and to receive and interpret JMF files</td>
<td></td>
</tr>
</tbody>
</table>

Due to scheduling consideration, and the efficiency of the **JDF Only solution**, we decided to keep this solution for the JDF implementation in the pre-press department.

**Major factors:**

- ROI,
- Automation,
- Leverage our industrial partnership with AGFA,
- Demonstration of the grey box concept.
Implementation Story

Project plan

As a prerequisites for this project, it was imposed to all participants that the production of plates by the offset department couldn’t be interrupted. The major effort of the project team was to organize this evolution accordingly.

Due to the existence of a 2 parallel lines of CTP, the only way to achieve this goal was:

<table>
<thead>
<tr>
<th>Methods used for plates production</th>
<th>Steps / Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual production of plates, following the previous methods of the atelier</td>
<td>1. the upgrade and work on 1st line, without any disturbance for the 2nd line</td>
</tr>
<tr>
<td></td>
<td>2. the move of the jobs of the 2nd line to the 1st line</td>
</tr>
<tr>
<td></td>
<td>3. the upgrade and work on 2nd line</td>
</tr>
</tbody>
</table>

**SWITCH TO LAST ORGANIZATION**

<table>
<thead>
<tr>
<th>Methods used for plates production</th>
<th>Steps / Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic production of plate</td>
<td>4. the installation of the NELA systems &amp; the setup of the JDF interface for complete automation</td>
</tr>
</tbody>
</table>

**Major Milestones**

Step 1 to 3 didn’t represent any complexity. The only consideration for us was to be sure that the procedure used by operators, before and after upgrade, was the same, and this was a key of success for the main part of the upgrade. This limits the changes at the operator level and limits the impact to the minimum to the production.

Step 4 of the project was the most critical and we had some bad surprises. This step include 2 types of issues: physical one with the automation of plate transport and logical with the JDF interface setup. I will describe issues related to step 4 more in details.
Detailed issues

Preps modifications
All our preps forms have been modified, because initially some preps forms files should be considered as a multiform form. This issue was an important one for the ApogeeX, because it’s waiting for a single form. So we had to modify our forms, in order to only have single forms files.

During this normalization, we tried to setup a rule name for the names of the forms file. This simple idea, was the way to rationalize the forms, because we discovered lots of forms files that were the same. This was a good way to suppress unused forms files.

Plate transportation
This perimeter includes all operations around the plates which are:

- transfer of the plate:
  - from the charger to the CTP,
  - from the CTP to the oven,
  - from the oven to the controls,
  - from the verification to the online punching system,
  - to the stacker.

- Operations on the plates
  - perforation,
  - bar code analysis with camera.

We experienced one issue, regarding the perforation, because there was a small mistake in the measurement. This caused severe outage, because during 2 days, the automatic perforations were unavailable. The partner had to rebuild a new punch table in order to correct this issue.
JDF Issue

The creation of the file was easy. The main issue was to really understand the way it works, and the way :ApogeeX works in JDF. This has been well managed by our partner AGFA and the main JDF expert was involved in this project, which for sure accelerated the project. This was a key of success for delivering the interface right in time.

Definition of the file

The file consists in 3 major elements:
- The path and the exact name of the form that should be used,
- The runlist of the files,
- The instructions that are sent to :ApogeeX in order for it to know how to proceed.

There were 2 type of actions:
- plates with the choice of 2 automatics CTP lines,
- imposition proofs with several choices (Xerox with a finishing option, or plotter for the form control).

Architectural issues

The files, when created by our PYRAMIDE system are delivered in a central file folder. This folder, is regularly checked by the JDF hot folder of :ApogeeX.

This issue, was important for us. For failover reasons, we have many :ApogeeX servers, so we need to find the best solution to define which server will manage the entire job. In our case, we defined in our interface which server would create the Job Ticket, and our system copied the file on the right server. We didn’t find any mechanism that could easily manage the load, that’s why the server choice is made on the end user interface, and by the operator, who knows exactly the load in the prepress department.

Generation of the JDF

The generation of the JDF file is easy, but as defined earlier, it depends on choices made by the operators: choice of the :ApogeeX server, type of ozalid proof, choice of the CTP engine.

So we decided to created a new module for PYRAMIDE, which major purpose was to allow the operator to:
- select the job number from the MIS that should be proceed,
- verify if the job can be proceed,
- define his choices, regarding the prepress charge and the output needed (proofs …),
- launch the JDF file to the right server.
Here is the detailed interface KIOSQUE of the PYRAMIDE system:

![fig 7: new developed module of PYRAMIDE - Kiosque screen overview](image)

Some more information about this screen:

- In line, you can find the signature, corresponding to the job. This information comes directly from PYRAMIDE. There is no retyping needed for this information.

- For each job, there are 6 columns:
  - “Tracé” which is the PREPS forms,
  - “Trame courbe” which is the calibration courb use by ApogeeX for the file treatment,
  - “IPLA”: ApogeeX server that will treat the demand,
  - “Sortie papier” which precise the imposition proofing,
  - “CTP”: name of the CTP line used,
  - The last column is a small icon that controls the customer files arrival. Green announce the operator that all the files are available for production. In this example, Sig CV and Sig 2 can be treated by the system. Sig 1 is not ready.
For information and comparison, a screenshot that describes the job inside our MIS PYRAMIDE:

Our next plan:

- Have the same approach with our gravure department,
- Suppress the use of PREPS and integrate the forms informations into the JDF files,
- Add a bare code for plate online analysis with camera,
- Receive the runlist with the customer files and provide it to the KIOSQUE interface. This will definitively suppress the folio management into the file names.
**Resulting Workflow/Processes**

We have now increased and extensively modified our prepress processes in the offset department. Now our prepress :ApogeeX system is linked with our home-made MIS, and the prepress department work with an updated information.

Our complete workflow from customer order to press is now :

- With the customer order, the producer creates a job in PYRAMIDE, with a full description of the job (number of signature, number of files, paper …).
- In parallel, he manages the planning with the planning department,
- When the job is complete (files delivery), it is available in the KIOSQUE interface,
- At any time, the prepress operator has an access to it, and can choose the right preps form for this job,
- When files have arrived (green icon), by using a single interface the prepress department can launch the treatment and retrieve all output for this job :
  - the plates,
  - different sort of ozalid forms for controls,
  - the ink information.

Please find here the comparison between tasks handled by prepress operators before and after the project :

<table>
<thead>
<tr>
<th>BEFORE</th>
<th>AFTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Reading and understanding of the folder, previously created by the producer,</td>
<td>1 Due to planning consideration, call of the Job folder via KIOSQUE, and control of the status</td>
</tr>
<tr>
<td>2 Delivery check of customer files with the transmission tools available,</td>
<td>2 When the status is ok, launch of the prepress job, using KIOSQUE.</td>
</tr>
<tr>
<td>3 Control of each file in order to verify they are all compliant,</td>
<td>No manuals operations between step 2 &amp; 10</td>
</tr>
<tr>
<td>4 Treatment of each file by the RIP,</td>
<td></td>
</tr>
<tr>
<td>5 Creation of the forms with PREPS,</td>
<td>5 Creation, in the prepress software, of a job ticket that contains plates formats, forms, where to find the files …</td>
</tr>
<tr>
<td>6 Creation, in the prepress software, of a job ticket that contains plates formats, forms, where to find the files …</td>
<td>6 Delivery and control of the forms with a global proof</td>
</tr>
<tr>
<td>7 Delivery and control of the forms with a global proof</td>
<td>7 Creation of the plates and manipulation between the different CTP phases,</td>
</tr>
<tr>
<td>8 Creation of the plates and manipulation between the different CTP phases,</td>
<td>8 Punch of the plates,</td>
</tr>
<tr>
<td>9 Punch of the plates,</td>
<td>9 Control of the plates,</td>
</tr>
<tr>
<td>10 Control of the plates,</td>
<td>10 Delivery of the CIP information for ink management,</td>
</tr>
<tr>
<td>11 Delivery of the CIP information for ink management,</td>
<td>11 Controls of the plates</td>
</tr>
<tr>
<td>12 Delivery of all elements that must go to the press on one stacker.</td>
<td>12 Delivery of all elements that must go to the press on one stacker.</td>
</tr>
</tbody>
</table>
This process is now completely automated, and avoids any mistakes due to retyping. Compared to the previous way of working, where all information were written and sometimes not synchronized, today, the job at the pre-press department is exactly the same as the one managed by the producer, and this integration avoids lots of mistakes (misunderstandings, written errors …).

This new model enables the prepress department to focus on value added tasks, like the choice of the CTP line due to load, or to concentrate on controls. The concept of one single interface is very appreciated at the department, because it simplifies and masks the software complexity. This advantage is impressive in terms of training, but this is very important for the future too, because we are really close to the “grey boxes” concept, and anybody cares of what’s inside the boxes. If the box 1 is down, they will use box 2. And this improves the day to day work at the plant level.

fig 9 : Photo of 2 CTP lines with the plate transportation system from NELA

fig 10 : Photo of the CTP with the autoloader in first plan from CREO
fig 11 : Photo of the puncher
Best cost/benefit realization

The benefits

This new process has allowed IDQ to reorganize its prepress department with an important reduction of the prepress preparation. Now anybody inside this department can concentrated on control tasks, whereas, before the implementation, lots of energy were spent. This evolution has been followed internally, and training has been provided by a project team.

Benefits in details:
- With the transportation system for plates, we reduced the workload inside the department,
- With the AGFA system, and the different sorts of ozalids, there is no more need for an operator to manage ozalid forms. It’s automated.

Additional effects

This automation process is very convenient for jobs that can be fully described in the PYRAMIDE System. This preparation inside PYRAMIDE is important, because it’s a key of success, when the job arrives at the prepress department. And this issue must be explained to anybody inside the organization, because the automation imposes to anybody to be more aware of it’s job and to it’s preparation.

That’s why we continuously organize training with producers and all those involved in the jobs, in order to get all the good parameters immediately. This is a key of success for automation.
Please find attached the ROI calculation that was made at the beginning of the project. As you will see, the presented ROI was about 6 months. And the main factor for reducing the costs, was the salaries.

Today, we identify some more organization optimization, while explains that the initial ROI of 6 month is not achieved. This situation is related to specific and complex jobs that cannot be fully automated, because of the amount of work they imply to be integrated inside our home-made MIS. This situation is due to particular jobs, where the number of folders is important for regional purpose. And this personalization is sometimes difficult to manage into an MIS.

We identified this as a critical issue, and we are working on a 100% integration of jobs into our MIS. The extra developments needed in PYRAMIDE are in progress and we hope to have this done before July 2008.
Our next target for 2008 is to allow the integration of the complex jobs, in order to get 100% of the jobs that are handled by our home-made MIS systems. Some new features need to be setup, before achieving this goal. And this last step will allow us to achieve our initial objectives, with a prepress team of 23 salaries.

Other targets for 2008 are:

- Have the same approach with our gravure department,
- Suppress the use of PREPS and integrate the forms information in the JDF,
- Add bar codes for plate online analysis with camera,
- Receive the runlist with the customer files,
- Receive order and runlist from customer using the JDF.