

Introduction to Workflow Automation

It is key in the graphic arts industry to drive automation forward. There are two different ways to accomplish that:

- a. automation of individual processes or
- b. automation of the workflow

Automation of machines falls into category a), that is, robots, cobots and production equipment modules that reduce human touchpoints. Software algorithm in Prepress for automating an individual task we also subsume under a). In a more abstract definition, a process is a singular activity with a specific objective that can be planned and executed independently. Example of processes are imposition, printing or folding.

Automation of class b) has two variants. One is of purely organizational (e.g. determining who is supposed to transport imaged plates to an offset press at what time). The other one is IT based, i.e. physical devices and software modules sharing electronic data to make sure that a process gets all the required information/resources that it needs for an automatic execution, at least in parts. We will focus on the IT-related concept. Please observe that automation a) and b) interweave.

Especially for presetting, a device needs data that is generated outside of the device. For example, a printing press needs to know for each print job the type, quality, thickness, and dimension of the printing substrates, the primary inks and the printing sequence and so on to set up the printing units and paper run. Of course, the press also needs physical assets like the actual paper, ink, and printing forms (plates) for conventional printing. We call all these (physical) “resources”. In general, a resource is either some physical object or some electronic/conceptual entities like PDF pages or parameter sets. For example, the process “printing” might need not only the above-mentioned physical resources but also the values for the ink zone profiles and previews of the sheets. The process will generate an output resource (print sheets), which in turn will be inputted by the next process. Resources that are output of one process and input of the next one, we call “transitional”. Transitional resources determine the order of processes. Note, that we name the physical thing and the description about it both with “resource”. The same applies to processes. In context, it should be clear what meaning is valid.

A “Process-Resource Model” (PRM) is a description of (production) steps via processes and resources in a net topology. A process can generate a resource; a resource can never generate another resource. Similarly, a process can only generate a resource and no other process. Thus, in a PRM resources and processes need to alternate. Please note that occasionally several processes are pooled to one “process group”.

A process or process group might be executed automatically if all input resources are available and relevant. For doing that, a device needs to fulfill some additional requirements that, for example,

- it understands the “language” that implements the PRM and
- it is capable of running in a self-acting manner.

The PRM is the most important means for modelling and automating print production. The model, however, can be deployed to other production areas or even to more general projects.

The Job Definition Format (JDF) is based on the process-resource model. This is also true for XJDF (Exchange JDF), but to a somewhat lesser extent. JDF and XJDF are the most dominant metadata formats in the graphic arts industry for implementing workflow automation. The specification for these formats as well as more general information about the underlying concepts can be found in www.CIP4.org. The

non-profit organization CIP4 (The International **C**ooperation for the **I**ntegration of the **P**rocesses in **P**repress, **P**ress and **P**ostpress) is responsible for the specification of these (and some other) formats.

As a user, one normally does not pay attention to these formats, just as little as the underlying PRM. Everything is hidden under user interfaces of Workflow Management Systems. For the planning of new production methods or production lines, however, an understanding of PRM and JDF/XJDF might be essential.