

AutoImp Integration

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Introduction

AutoImp is orders processing automation workflow deployed in KSERKOP printing house. It automates most of the production process, starting from jobs acquisition, up to packaging and shipping.

Key Features

AutoImp functionalities in brief.

- Orders are supplied via internet using various standard protocols (e.g. FTP). From AutoImp perspective, the trigger that initializes the order process is the appearance of the order package file in one of dedicated hotfolders (physical directory in the printing house infrastructure).
- AutoImp constantly monitors a set of hotfolders, using load-balancing techniques for fluent orders queue consumption. From a single unit view, once new order package is spotted, the system starts monitoring an incoming file checksum, waiting for its stabilization.
- When the incoming file is ready for processing, AutoImp automatically unpacks the package and makes an analysis of included structural order description. The description is JSON-formatted textual data, containing all necessary order information (described in details below).
- Among the order description, the package should contain all graphic files related to every product included in the order. Technical details of files preparation (file format, size, number of pages, bleeds, colours, images resolution) strictly depend on product type. In general, for every product included in the order there should be one or more related PDF (or JPEG) file(s), with the proper naming convention.
- Optionally (depending on arrangements with the printing house), the order package may contain a single print-ready waybill (target shipping letter) in a form of a PDF file, with the proper naming convention.
- Having all product files, AutoImp makes a preflight of the supplied material. Preflight verifies if the material matches technical requirements of the production process: files format, number of pages, sizes, bleeds, colours, advanced contents properties and more). At this step AutoImp automatically generates previews, barcodes and other assets necessary for further order identification and processing.

- As a principle, incoming file contents is not modified during the entire production process. Small discrepancies between the actual material parameters and the production requirements (e.g. bleeds size) can be adjusted on-fly by AutoImp subprocesses. Depending on arrangements, a product may be printed with a barcode necessary for unambiguous product identification. For a reliable colour reproduction, high-end products coloristic may be also adjusted to device-specific colour profile. But as a rule, every graphic material is printed as-is, without DtP adjustments.
- Once all graphic material of all products is successfully preflighted, the order becomes ready for production. AutoImp sends e-mail notification to the printing house operators, with an optional carbon copy to the order supplier. If the order preparation fails (e.g. invalid order description, missing or incorrect files), the notification also informs about the failure.
- AutoImp automatically collects products of the same technical specification (type, format, paper etc.) and joins them into production jobs. The production job is not seen by the order supplier. In brief, it consists of several assets generated by AutoImp: a job card (technical specification of the order), imposition file(s) optimized for efficient printing and finishing processes, related waybills list and others.
- Production jobs are released for printing on the base of a precise time schedule or a manual operator action. Spoolers of printing devices are feed with an imposed print-ready data. Printing house operators are notified accordingly.
- Printed sheets are passed to cutters and finishers. This step is very different for various product types. On each production stage every operator has a clear distinction and identification of the order, the product, and the production job.
- Final products are collected on completion and packaging stations. Collected waybills are batch-printed on a labels printer. AutoImp registers completed products and orders on the base of barcode scanners ticks. When collected packs are ready, AutoImp generates the final completion document (eq. stock issue confirmation), which is usually shipped together with the order or orders collection.
- Last but not least, AutoImp automatically cleanups and archives completed orders.

Design And Architecture

AutoImp has several architectural layers that communicate between each other using standard protocols. All its functionalities are tailor-made for the specific of the commercial print-on-demand production. As such, AutoImp is customizable for various production lines and opened for functional extensions. However, its main design concept is to maximize the role of automation engines and to minimize sophisticated interfaces.

Therefore, from the order supplier perspective, AutoImp acts as a robot that consumes the order and provides the simplest possible feedback.

Communication Scenarios

In the typical scenario, AutoImp spots a set of order packages and responds with an e-mail, several seconds after that. If there are multiple orders provided in a short span of time (e.g. 1-5 seconds), a single e-mail contains a confirmation of receiving several orders. In case of notification failure, AutoImp repeats notification attempt several times in reasonable time intervals.

To obtain at least basic formatting features, e-mails are generated in HTML format. Their structure is pretty simple, but this shouldn't encourage order suppliers to rely on that structure for automation. The subject, body, headers, attachments of e-mails might change without prior notice.

As an alternative or extension, HTTP post with a simple JSON data can be sent to a specified URL, confirming the order initialization. The confirmation contains the order identifier and the list of product identifiers, associated with products preparation and files preflight status.

In addition to initialization message, AutoImp can also send a notification (of either form) at the end of production process, once the order is ready to be collected by a shipping service. However, in the default scenario, this message is switched off. From the order supplier perspective, the vital information is *order-on-the-way* rather than *order-is-ready-to-be-shipped*. And in practise, *on-the-way* message is provided by shipping services.

As a rule, AutoImp do not inform order supplier agents about fine steps of order production. In the case of particular business needs, and on the base of extra arrangements with the printing house, AutoImp can provide finer notifications schedule based on internal production steps.

Identifiers

AutoImp puts no explicit restrictions on the form of orders and products identifiers. However, for sake of unified production process (e.g. barcodes formats and aesthetic placement, stock documents layout and such), order suppliers are expected to provide identifiers in format previously agreed with the printing house. These are usually numeric identifiers composed with at least 8 decimal digits, with the first digit fixed.

Both order identifier and product identifier should be unique. If the order always contains just a single product, it is acceptable (but not recommended) to use the same identifier for both order and product. But in general, order identifiers and product identifiers should be different and unique in time.

Two orders or products of the same identifiers, present in the production flow at the same time, are recognized by AutoImp as a production impediment. The operator is supposed to resolve the conflict. It is acceptable to reset the identifiers sequence or generator seed in reasonable span of time (e.g. a year or two). AutoImp joins identifiers with time-stamps, so repeating an order or a product identifier after a long period of time does not cause the conflict.

Order Package Specification

Orders are supplied in a form of ZIP archives, with the file name corresponding to the order identifier. In example, if the order identifier is **12345678**, the supplied package file name should be **12345678.zip**.

The ZIP package should contain:

- order description (JSON)
- all files related to included products (PDF, for specific products also JPEG)
- optional assets (e.g. waybill)

An order description, as well as included products descriptions, may depend on production line details.

Roughly, the order must specify:

- order identifier
- list of products

A minimal example of JSON order description :

```
{
  "order_id": "46782001",
  "products": [<list of product descriptions>]
}
```

Note that the order description and product descriptions contain technical parameters only, no business information included.

Every item of the products list is a JSON object that defines:

- product identifier; as described above
- symbolic product type

- paper identifier; compound paper registry number and gsm
- product format; compound net size of the final product (default unit mm)
- folding, if applies
- number of copies
- varnishing symbol, if applies
- optional dictionary of additional options, if applies

An example description of a simple product (folded invitation):

```
{
  "product_id": "49116715",
  "type": "INVITATION",
  "paper": "PN02-200",
  "format": "100x200",
  "folded": true,
  "copies": 50,
}
```

And here is a specific product; mini pocket album on a photographic paper, with a leather cover (not printed) and implied (fixed) number of pages:

```
{
  "product_id": "49116713",
  "type": "POCKET_ALBUM",
  "paper": "LAB02-230",
  "format": "53.5x75.5",
  "copies": 1,
  "options": { "cover_color": "black" }
}
```

A description of a compound product, containing a block and a cover; standard photobook with a soft cover varnished with a matt foil (fm symbol):

```
{
  "product_id": "47716782",
  "type": "PHOTO_BOOK",
  "format": "200x200",
  "paper": "PN01-150",
  "pages": 24,
  "copies": 8,
}
```

```

    "cover": {
      "cover_type": "book_soft_cover",
      "paper": "PP01-170",
      "options": { "inset_color": "white" },
      "varnishing": "fm",
    },
  },
}

```

Product description JSON object contains properties related to the product block (e.g. paper) and properties related to the entire product (e.g. copies). Cover subobject contains properties related to the cover and binding process.

The set of acceptable product types and the domain of parameters combinations (formats, papers, page counts, varnishings) is arranged with the printing house. During arrangements with the printing house, a set of complete sample order packages are provided to the order supplier as a reference.

Response Communicates

HTTP post optionally sent by AutoImp after receiving the order reflects the initial order structure:

```

{
  "order_id": 43211234,
  "status": "pending",
  "products": [
    { "product_id": 43214321, "status": "pending" },
    { "product_id": 43214322, "status": "pending" },
  ]
}

```

If order description is invalid, order status may be **invalid**. If there was an error during product files preparation, the product status may also be **invalid**:

```

{
  "order_id": 43211234,
  "status": "pending",
  "products": [
    { "product_id": 43214321, "status": "invalid" },
    { "product_id": 43214322, "status": "pending" },
  ]
}

```

}

Only serious errors are notified that way (e.g. missing files, invalid format, wrong number of pages). If the product status is invalid, the product won't be taken to the production flow until corrected graphic material is provided. Depending on arrangements with the printing house, it is also acceptable to provide a package with another order and product(s) with the same identifiers but corrected files. The printing house operators must be informed about that to discard the previous order and avoid identifiers conflicts. Invalid input material always implies extra communication with order provider and manual operations. It breaks fluent production flow and should be avoided.

In any case, AutoImp ignores HTTP response from order supplier server. Nothing depends on if the message has been received or not.

Files Naming Convention

Note that the JSON products description do not contain related graphic files specification. Graphic files are matched with products on the base of files naming convention. Every product file should have the following file name prefix:

```
<order_id>_<product_id>
```

In example, a PDF file related to product **12345678** of order **87654321** should be named

```
87654321_12345678.pdf
```

If the product consists of a block and a cover (e.g. photobooks), a meaningful **cover** and **block** suffixes should be present in file names:

```
87654321_12345678_cover.pdf
```

```
87654321_12345678_block.pdf
```

Some products (e.g. photoalbums printed on a special photographic papers) are provided in a form of JPEG files. In that case, every page or spread of the product is given as a separate file:

```
87654321_12345678_001.jpg
```

```
87654321_12345678_002.jpg
```

```
87654321_12345678_003.jpg
```

...

```
87654321_12345678_016.jpg
```

An interpretation of the page number suffix (001, 002, 003, ...) is not always obvious, because a single file may represent either a page, or a spread. AutoImp do not interpret this suffix. Instead, it makes an assumption that in case of multiple product files (of any type), the lexical order of file names corresponds to the desired product pages sequence.

If the order comes with a waybill document (shipping letter), the waybill should be provided in a form of print-ready PDF document of the following file name pattern:

`<order_id>_ety.pdf`

Using order identifier from the previous examples:

`87654321_ety.pdf`

To Be Agreed

Details to be agreed between the printing house and order supplier:

- order identifiers
- product types and a set of parameters combinations
- barcodes placement

Changes

AutoImp evolves while incorporating new production lines and integrating new orders suppliers. Its main set of functionalities is already established, but integration and communication details may change. Vital changes of order / product description are first consulted with order suppliers.