Automation Engine

Integrating with External Systems

ESKO

Contents

1. Introduction

This chapter is a guide for those who want to connect their Automation Engine server with other systems. Typically these systems are

- Business Systems like MIS (Management Information System) or ERP (Enterprise Resource Planning). These systems usually have components like order entry, price calculation, customer database, production planning, stock etc.. These systems can be purchased by your company from an MIS vendor and then adapted to your specific business process or your company could have created her own unique system.
- Asset Management systems. They focus on managing and sharing your prepress data and are usually web-enabled.

A connection between your Automation Engine server and (one of) these systems is of course digital and can be one-directional, bi-directional or, in case more than 2 systems are connected, even triangular.

Note: Throughout this document, for the sake of simplification, we will name such systems 'the external system'.

Note: Many features that we describe in this chapter require the optional module named **Automation Engine Connect**.

Note: A separate chapter is available on *Integrating Automation Engine with Esko WebCenter*.

1.1. Why Integrate?

Faster.
No time is wasted by waiting, usually for a person.

Better.
Error reduction: no errors re-typing or misinterpreting. A small error can have huge costs. A wrong 'status' interpretation can have major production (cost) consequences.

More consistent, more process control.
Having a consistent way of working will benefit all. It is easier to train new people. It will be required when your company is trying to receive quality certifications (ISO etc..).

Operators in both departments can focus on more added value tasks.
The freed up time can now be used to increase the *quality* of what they do or to *think* their actions over. Hiring new (young) people will be easier when they see you have modern ways of working.

Now let's have a look at what information typically is exchanged in each direction.

1.2. External System sending commands To Automation Engine

Create an Automation Engine Job and set Job parameters.
An Automation Engine Job represents a job order that you get from the business system. So it is logical not to create those Automation Engine Jobs manually but to get your instructions from that system in an automated digital way. All the parameters should then be picked up in a highly automated workflow.

Create an Automation Engine Product and set Product parameters.
New design data that arrive can be automatically added to the Automation Engine Products database, including the detailed product specifications like barcode and inks. Often, these design data arrive before there is a job order to produce them. The workflow can link this newly created product to a Job.

Start an Automation Engine workflow with parameters defined by the external system.
Not all parameters need to be stored first in a Job or Product: Automation Engine can also retrieve parameters from an external system during a workflow and use these parameters in subsequent steps of the workflow.

1.3. Automation Engine sending commands To an External System

Setting Job or Product status in that external system.
The business system is very interested in what is happening with the job in the prepress department. Being automatically informed on the exact status can have major benefits: Your sales/service people will have up to date info for your customer. Your production will be more efficient when its planning is based on reality. Automation Engine can send such feedback automatically. And based on that new status, the external system may also decide to start an own automatic workflow.

Initiating actions on that external system.
Automation Engine could even do more than that. It could really talk to that external application, ask questions and come back with a set of information.

1.4. Some general advice

Have a project manager
Appoint someone who owns the mission to do this. This integration can affect many people so someone needs to be in charge. It is actually possible that it is the first time that these 2 different departments (sales-service and prepress) are part of a same project. Each department will defend its way of working. Each department will not know all complexities of 'the other side'.

Change Management
When you start eliminating some human intervention, it is possible that new questions will come to the surface. Any changes in the way you work in such a busy production environment will need to be

defended. The integration is indeed technical but it is actually *not* 'just an IT project': the reason you do this will be of interest to higher management. Often higher management is where such ideas to integrate start. Making some changes will be necessary to get that higher efficiency that they are looking for.

Step by Step

Start with a step that is 'obvious' and build from there. Before 'going live', carefully test and dare to consider all sides of the changes that this integration will cause. Using *both* the new *and* the old workflow can be confusing, so be prepared to switch over fast.

1.5. Need any help?

If you want help with your integration project, Esko offers 2 levels of service.

- Standard training by an Esko Academy trainer.

  Esko trainers will explain the Esko part of the tools.

  Tip: After learning about the concepts and features in this documentation, we advise to also check the chapter *Examples* on page 96.

- Help from an Esko Solution Architect.

  Esko Solution Architects are experienced in such system integrations and have a broader knowledge of 'workflow', beyond the world of Esko products. Contact your Esko sales rep if you want to know more.

1.6. What about JDF?

Note: Job Definition Format is a standard language based on XML. It was created by the CIP4 group to help standardize system integration in the printing industry. Learn more on *http://www.cip4.org*.

Integrations that use JDF/JMF require assistance from an Esko Solution Architect. That is why this documentation does not cover JDF/JMF.

Note: With some specific MIS, Esko optionally offers a 'standard' integration package based on a White Paper. Contact your sales contact if you want to know more.

2. Integration Concepts

Let's distinguish the main *concepts* in integrating with Automation Engine. In many integrations, several of these concepts are combined. There is no pre-defined order in which these concepts whould be used in your particular case.

The tools that we here introduce are documented in detail in the next chapters.

2.1. Access Points Triggering a Workflow on Automation Engine

Access Points trigger a workflow after they detected a signal from 'outside'. They use a 'polling' mechanism: they check at a regular time interval if they have to trigger that workflow. There are many types of Access Points and you can create as many as you need.
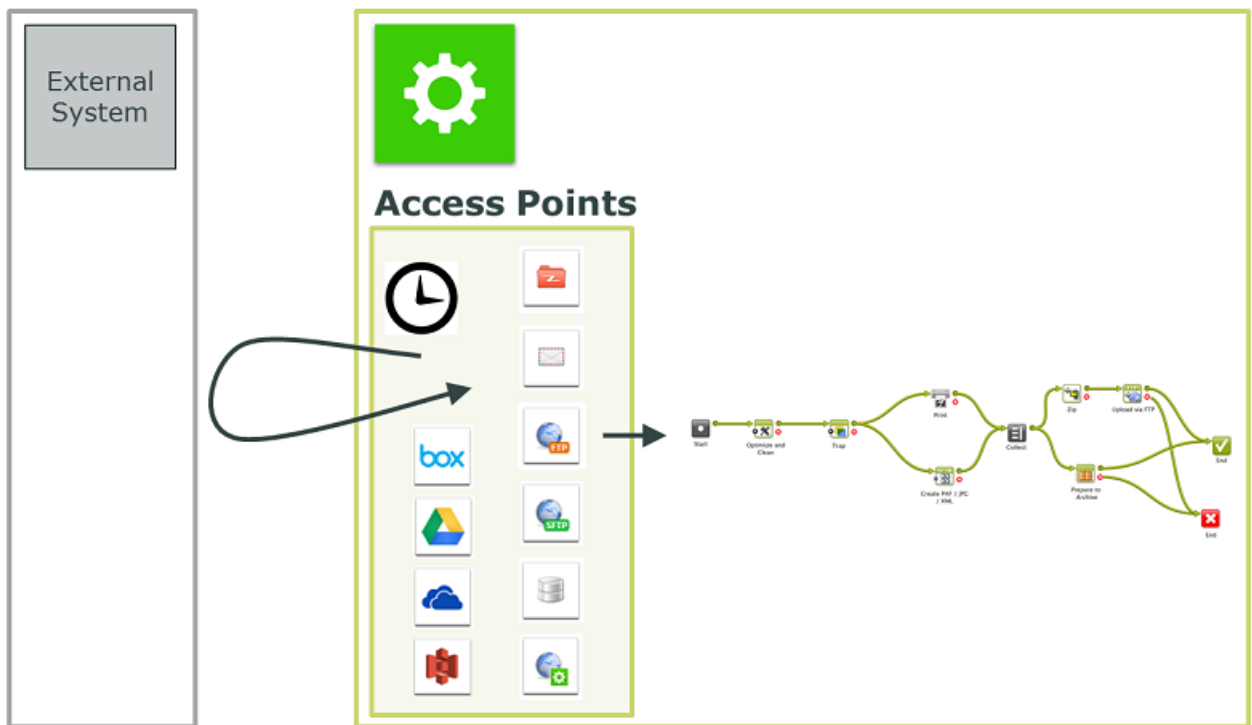
A typical example is a classic hot folder (a **Folder Access Point**), where the incoming data is then processed and the result is output on another folder. For example: design PDFs arrive in a hot folder and from there they will be automatically trapped and then written to another folder.

However, Access points are not only used to start work on that incoming data. They can also receive *parameters* for the workflow that they will start. These parameters define *what* needs to be done in the workflow with some other (set of) file(s). For example: a Folder Access Point receives an XML from the

order entry system. The XML describes a list of re-run print Jobs. And for each **Job** it describes which **Products** need to be linked into that Job and what quantity needs to be printed.

Or, instead of *receiving* those parameters, Access Points can *go and search* for them. For example: a **Database Access Point** looks up the desired trapping distance in an external system. This results in a SmartName that the trapping task then uses.

Other types of Access Points are **FTP**, **SFTP**, **Mail**, **Web Service**. Then there are several variants that get their data from cloud storage applications. Learn more in *Access Points* on page 16.

It's all about SmartNames!

In most cases, these parameters that come in from the external system are turned into SmartNames. And then these SmartNames will be picked up in the workflow tasks. These SmartNames can be stored in Job or Product parameters, when they describe job or product characteristics that are relevant for the lifetime of the job or product. When the parameters are relevant only for the workflow started by the access point, they can be used as workflow parameters.

2.2. Automation Engine tasks Interacting directly with the External System

Not only Access Points can contact an external system. There are also 2 Automation Engine tasks that are dedicated to interact with external systems. Contrary to Access Points, their interaction can be **bi-directional**. Besides retrieving data from external systems, these tasks can also be used to provide feedback to external systems. This will be described in more detail later. However, these 2 tasks are typically used because the **workflow needs this interaction before it continues**. The result of these tasks will be used in the next steps of the workflow. As usual, this can be creating Jobs or Products, or get values for SmartNames to be used in that workflow.
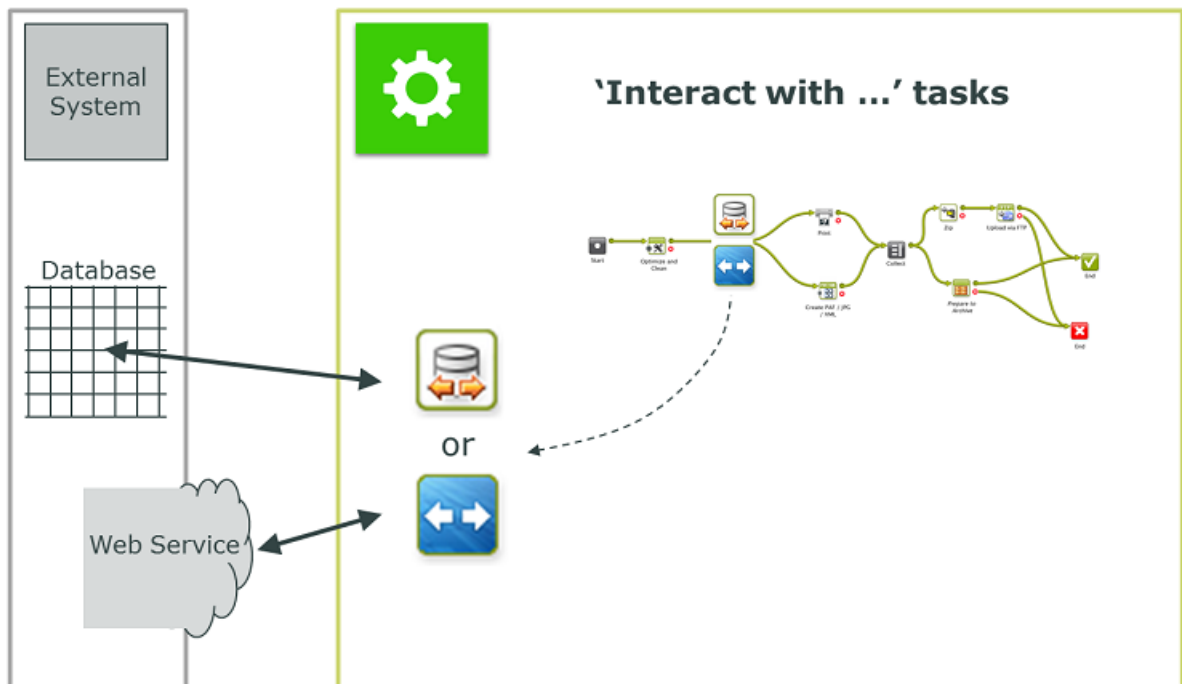
- The **Interact with Database** task

  Automation Engine can use this task to **read** a value from an external database. For example: an operator starts a workflow to Step & Repeat and output. The workflow asks the database of the production planning system on which press this job will be printed. This is needed to know the layout size and also any dot gain curve. This press choice can be decided very late, so it might not have been part of the Job parameters that were created earlier.

  Note: Reading from an external database is also possible by using a simple SmartName query or by using a Database Access Point.

  Automation Engine can also use this task to **write** directly into the database of the external system. For example to inform it on the new status of a Job or Product. When that system can not read XML messages with such information, then you can consider to have Automation Engine write this information directly into the database of that system.

  ⚠️ **Caution:** This is a very direct way to have applications connect. This must be well designed and carefully tested.

  Important: Esko takes no liability for queries that write or change fields in that external database.

- The **Interact with Web Service** task

  The concept is very similar to the one above, but here the task uses HTTP calls to a web service. Also here, both **read** ('GET') and **write** ('POST') commands are possible. When the external system is running a web service, you will be able to access it via HTTP (Hypertext Transfer Protocol). However, you also need to learn **how** to communicate to that system. Some applications will indeed publish their API (Application Programming Interface). For example Automation Engine can use this task to

ask a question to Google Maps. This is only possible because Google Maps did publish its API (and runs a web service). This example is illustrated in the chapter *Examples* on page 96.

Typically, both these tasks execute such interactions as part of a larger workflow in Automation Engine. Find their detailed documentation in the chapter *Tasks Interacting with other Systems* on page 80.

Note: The **Integrate with WebCenter** task is described in *Advanced WebCenter Integration*, a chapter of the document on integrating Automation Engine with WebCenter.

2.3. Automation Engine Mapper tasks Transforming Data

Automation Engine offers many ways to use XML to control the workflow. Automation Engine also offers many features to create XML files. But sometimes you need to create an XML with a different content or formatting.

This **Create XML File** task is typically used to create XML files that are to be read by external systems. In such XML files, you sometimes want more or less information. And sometimes you need to re-format data in a way that the external system prefers.

Then there are the specific data formatting tasks like **Split XML**, **Join XML** or **Map Data** task. These are powerful tools that offer many more ways to control XML files. Sometimes the data (information) that comes from an external system first needs to be transformed before it can be used in Automation Engine. Sometimes, these transformations are classic file conversions like CSV to XML. The **Map Data** task was created to do this. Sometimes the XML will first need to be split in several XMLs (**Split XML** task). Sometimes it will be useful to join several data files into one XML (**Join XML** task).
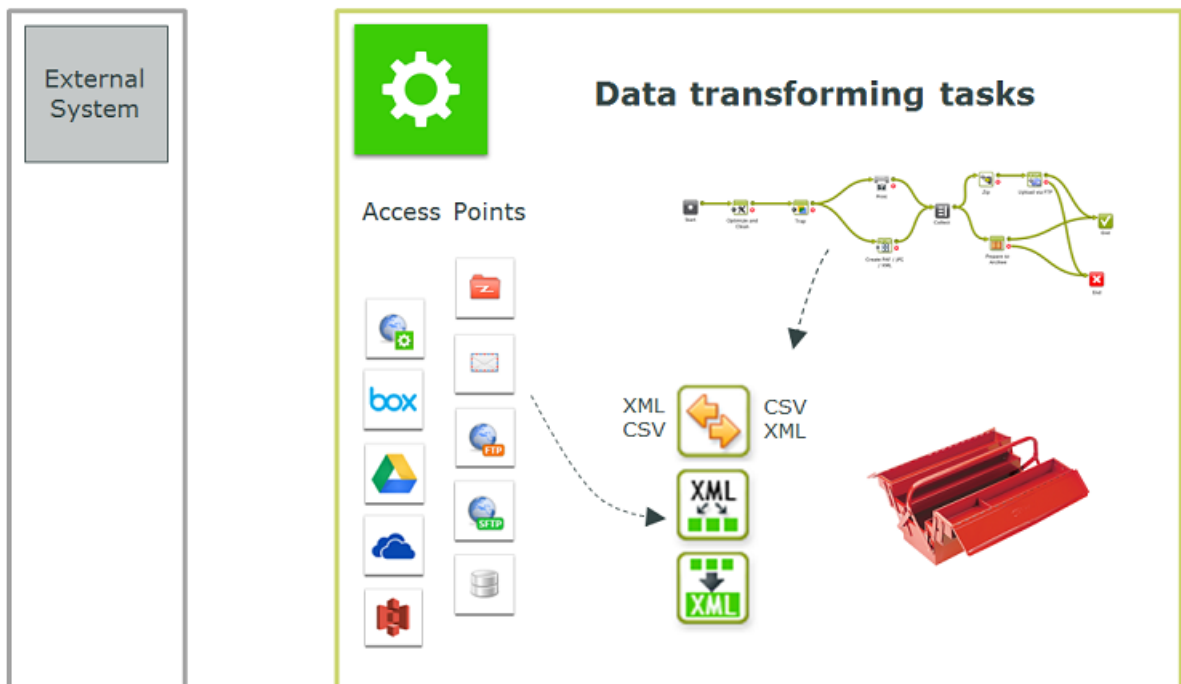
Data transforming tasks can be used at any step in a workflow. They are used

- at the start of a workflow, to help transform what an Access Point delivered.
- at any other point in a workflow, also often at the end, to translate information into a format that the external system prefers.

Find a detailed description of these tasks in the chapter *Data Transforming Tasks* on page 48).

2.3.1. Transforming data from an Access Point

Here are some examples where data transforming tasks are used right at the beginning of a workflow that is started by an **Access Point**:

- The external system provides a list of jobs to be processed under the form of a large XML that it writes on the **Folder Access Point**. The **Split XML file** task then creates 1 XML file per job entry. These separate XML files are then used for the **Create Job** task.

- The external system sends an CSV file on a **Folder Access Point**. The **Map Data** task first transforms it into an XML. Later in the workflow, SmartNames will get their values by reading from that XML file (Xpath queries).

- Some Access Points do not even result in data *files* yet. In case of a **Database Access Point** or a **Web Service Access Point**, the accessed data can arrive as a several XML files. This is where you can use the **Join XML** task to create a single and maybe even simpler XML file. Again, that XML file is then typically the base to provide SmartNames their workflow specific value.

2.3.2. Transforming data from a workflow

There are many moments where it can be necessary to transform Automation Engine information. Typically when sending information to external systems. Some of these external systems have their own mapping tools to read these incoming XMLs anyway. But sometimes you will be asked to have Automation Engine transform this information first.

Some examples:

- The MIS can not read an XML file but can read CSV. This is a classic use case for the **Map data** task.

- The XMP (metadata) of a PDF needs to be sent to the external system as an XML. The **LinkEdge** task does that. But maybe the MIS wants to have the ink coverage information formatted in a different way. And maybe it is also necessary to convert the millimeters into inches.

- When using the **Interact with Web Service** task to ask the web service of Google Maps the distance to a customer, the answer needs to end up in an XML or a SmartName.

- A **Step & Repeat** task requires a specific XML as input file, with a different structure than the one from the external system.

- The **Create Job** task requires information that is present in 3 XMLs, from 3 different sources.

- The XML with feedback that you want to send to the external system needs to contain both a Job status and some meta data from the PDF.

2.4. Automation Engine sending data Back to the External System

We briefly described this topic in the introduction (*Automation Engine sending commands To an External System* on page 7). Here, we add some detail and mention some tools.

A workflow in Automation Engine always generates output data, and often even many kinds. A lot of that data is not just for other prepress components, but for external systems. We distinguish **2 main types of data**:

- **Sending Prepress data (back)**
  - Data for output devices like proofers and RIPs (CTP, DFE, Press)
  - Data for people, often customer service or sales people or end-customers (PDFs attached in e-mail or sent via FTP)
  - Data for external systems, some of which web-enabled, often to view, approve or exchange 'assets'. In many cases it is not the original production files that are sent but smaller versions (less Mb) or more secure versions like password protected PDFs (JPEGs, RGB-PDFs, viewer streaming data, 3D files...)

- **Sending Communication data (back).** Here, the goal is to inform. Some communication will be about a status, for example 'plates made'. Some will be about describing the (new) prepress data themselves, for example the ink coverage of a production PDF. This communication data can also be files or it could be 'live':
  - Communication *files*: XML, XMP-XML, CSV, TXT
    - written on a network share, typically on a hot folder of the external system
    - sent via e-mail or FTP

  - Communicating *directly* with the external system: (see also *Automation Engine tasks Interacting directly with the External System* on page 10.)
    - directly to its database, writing or updating fields
    - directly to the web service of the API of that external system
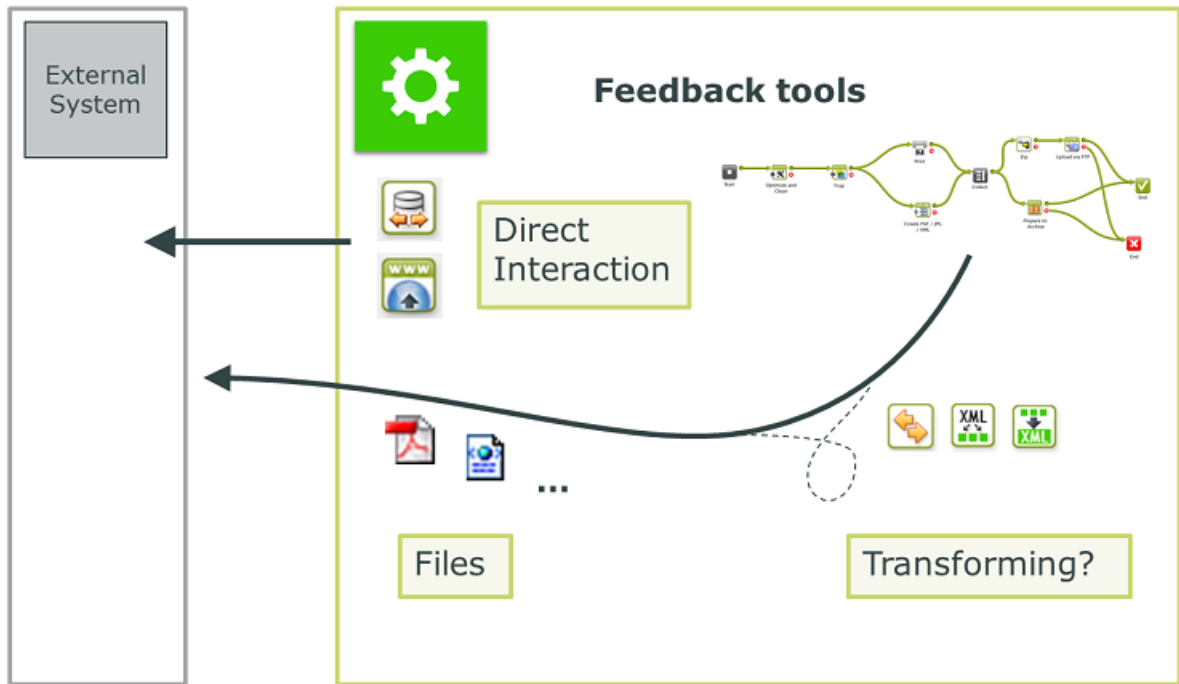
Transforming data before sending

Sometimes the external system does not support one of the above file formats or interaction protocols. In those cases, the **Map Data** task can help to convert. Find an introduction to this concept in *Automation Engine Mapper tasks Transforming Data* on page 12.

Tip: You do not always need to send a lot of Mb to send a lot of information. For example: an XML describing de bar code parameters can be more useful than a high-res PDF. You could zoom-in on the PDF but the XML will tell you even the non-visible parameters of that bar code (type, bar width reduction, distortion...)

3. Access Points

An Access Point launches a workflow after it detected a signal from 'outside'. Automation Engine offers many types of Access Points. The most classic example is a **Folder Access Point**, which is also often referred to as a 'hot folder'.

Tip: We advise you to first read about the *concept of Access Points*.

The Access Points View and Tool

The **Access Points** View (in the Views category **Setup**) is where you create, modify and have an overview of your Access Points.
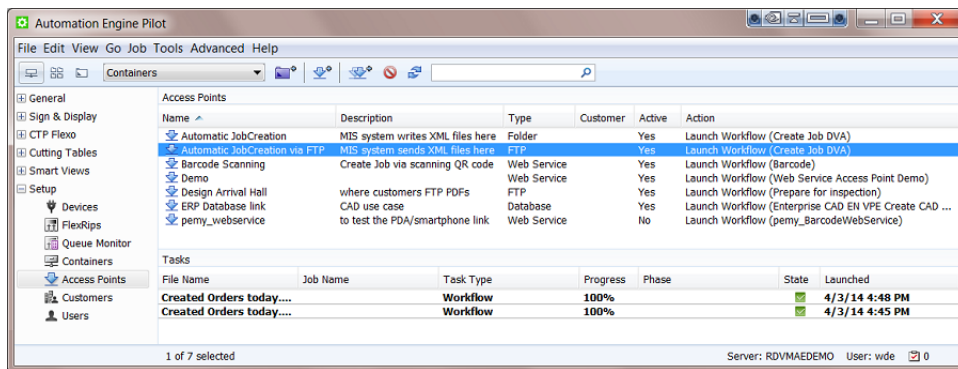
The top part of this view shows a list of all the **Access Points** that you configured.

The bottom part is a task monitor that shows the **Tasks** that were executed by the selected Access Point.

Working with Access Points (the basics)

We here list the main functionality that is available in tool bar (or via the **File** menu). The next pages add details per *type* of Access Point.

- : To **create** a new Access Point.

- : To **duplicate** an Access Point. The selected Access Point will open with empty fields for Name and Description.

- : To **delete** a selected Access Point. You will be asked to confirm.

- : To '**scan now**'. To manually make the selected Access Point scan for new files at that time. This can be useful when you do not want to wait for the time interval (see further).

  Note: This function is disabled for the **Web Service Access Point**.

To **modify** an existing Access Point, select it from the list and double click it.

To **deactivate** an Access Point, right-click it and choose **Deactivate Access Point**.

Differences in how they work

This table illustrates that some Access Points work in a slightly different way:

Table: Access Points – technical differences

Access Point Type	Checks for data at regular time interval ('Polling')	Uploads that data	Starts a workflow
Folder	V	V	typically
FTP	V	V	typically
SFTP	V	V	typically
Mail	V	V	typically
Database	V	- (**)	typically
Web Service	- (*)	- (***)	always
Google Drive	V	V	typically
OneDrive	V	V	typically
Box	V	V	typically
Amazon S3	V	V	typically
Esko Cloud	V	V	typically

(*) The external system decides when to contact the Access Point.

(**) The Access Point *goes to and gets info from* an external database.

(***) The Access Point *waits* until it *receives* an HTTP command from the external system.

Access Point SmartNames

There is a specific category of SmartNames for Access Points. They enable smart re-use of many attributes of an Access Point. All Access Point SmartNames are also automatically stored as workflow parameters.

Learn more about SmartNames in the dedicated chapter *SmartNames*.

3.1. Folder Access Point

3.1.1. Concept

What is a Folder Access Point?

A **Folder Access Point** monitors a folder located somewhere in an Automation Engine **Container**. Every time one or more files are uploaded into that folder, the **Folder Access Point** will move the files to another folder where they will be processed. **Folder Access Point**s are typically created to launch a workflow using those incoming files as input files for that workflow.

However, you can also choose *not* launch a workflow. In that case the **Access Point** only serves to upload files onto a specific folder in an Automation Engine **Container**.

Note: The Folder Access Point is the folder itself, not any of its subfolders.

Tip: The section *Examples* on page 96 contains an example case of a **Folder Access Point**.

Note: **Folder Access Point**s can also be used to process incoming JDF files. Learn more about using JDF in *What about JDF?* on page 8.

3.1.2. What about Hot Folders?

Before version 14 of Automation Engine, you could create **Hot Folders**. When you upgrade to version 14, they will **not** be automatically migrated to **Folder Access Points**. They will stay hot folders and will still function as they did before.

Note: If you created hot folders in a version older than version 14, you will also keep your **Hot Folders** view in the Pilot of your version 14. If you haven't created hot folders in Automation Engine before upgrading to version 14, you will not see the **Hot Folders** view in the Pilot.

Tip: When you (manually) convert a hot folder into a folder access point, you can use the **Export Ticket...** button in the setup of the hot folder. You can then use that ticket in the *setup of the Folder Access Point*.

The following options were previously available in hot folders but are not available in **Folder Access Points**. This is because there are now other and better ways to do these actions:

- the annotation for the workflow task (you now write a 'description').
- grouped launching (you now can still create this effect by using a ZIP, but the most typical use cases are covered when you use the **Gang Run Printing** related features).

- delete input files when the workflow is finished (you now can do this by using a **Delete File** task at the end of your workflow).

3.1.3. Creating or modifying a Folder Access Point

Follow these steps to create or modify **Folder Access Points**:

1. In the **Pilot** click on **Access Points** view. Alternatively, choose**Tools** > **Access Points**.
2. In the dedicated **Access Points** view, click on . Alternatively, choose **File** > **New**.
3. In the resulting window, select **Folder** and click **OK**.
   The **New Folder Access Point** window will open. Here is one with some typical settings already filled in:
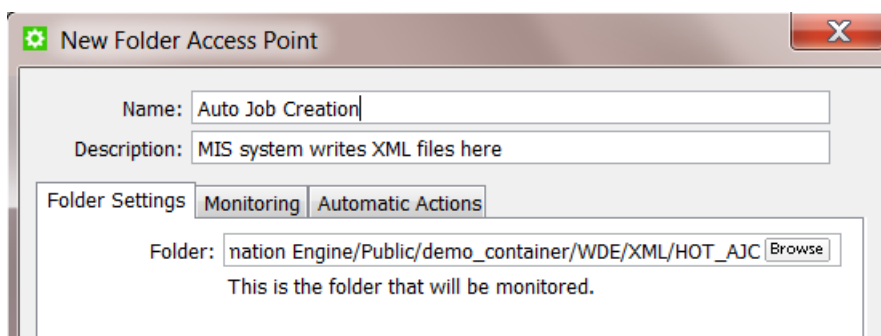
4. Enter a **Name** for the **Access Point**.

5. If you want, enter a **Description**.

    This will help identifying your **Access Point** without having to read all its settings.

6. In the tab **Folder Settings**, define which folder will be the actual Access Point that will be monitored by Automation Engine. Use the browse button to indicate it.

    This folder needs to be *inside* a **Container**. This folder may not be inside another **Folder Access Point**.

7. In the tab **Monitoring**, define the time interval.

    *   **Check Every**. Enter the time interval with which Automation Engine should check if any new files came in. Think of the time interval as the *maximum* time it takes for the new files to be picked up.

    *   **Schedule**. If you want this Access Point to be inactive during a part of the day, then activate this option and indicate the start and end time of that period.

        Note: Such a temporary inactive state will not be shown in the general Access Points View. In that View, the column 'Active' shows its *general* status.

8. In the tab **Automatic Actions**, define what needs to happen.

    *   **Move Files to**. This is the folder where the files will be processed. These files have to be moved to avoid that the **Access Point** would process the same files again and again.

        Important: If this destination folder is part of a Job Folder, the workflow that this access point launches will run in the context of that Job.

    *   **Rename Files to**. If you want you can choose to rename these files too. To do this, enter the new file name.

        Tip: Typically, SmartNames are used here to help indicate in their name *when* they were processed or *where* they came from.

    *   **Action**. Choose:

        *   **None**. Choose this option when you only want to use this **Access Point** to *move* the files.

        *   **Workflow**. Choose this option when you want a workflow to start. Select the workflow ticket from the offered list. The new accessed files will be used as input files for this workflow. If these files are inside a Job Folder, the workflow will be run in the context of that Job.

> ⚠️ **Attention:** Make sure your workflow **can** start with the type of files that will arrive.

Options:

- **Operator**: Choose the operator that will be shown as operator for the workflow task.

  > **Tip:** If you do not want to assign one specific person, you could create an operator named "Access Points" or "Automatic" and assign that one here. Also remember that the Access Points Task Monitor shows you the tasks launched by the selected Access Point.

  > **Note:** If you leave this option blank, a system user "UPLC" will be used.

- **Priority**: Choose the priority for this workflow: Low, Normal or High. The default priority is 'Normal'.

- **Process JDF**: Choose this option when this Access Point will be used to process incoming JDF files. For more info on JDF, read this section: *What about JDF?* on page 8.

3.2. FTP Access Point

3.2.1. Concept

An **FTP Access Point** monitors a folder on an FTP site. At a regular time interval, it checks if new files have arrived in that folder and it then moves them to a specified folder in an Automation Engine **Container**.

> **Note:** There is no FTP server embedded in Automation Engine, so this functionality relies on a FTP server that has been setup separately from Automation Engine.

This also works for new files in any subfolders of the scanned FTP site. Those files will be moved to an identical structure of subfolders that will be automatically created.

> **Note:** Non ASCII characters are not supported (ASCII = a-z, A-Z, 0-9).

An FTP access point can also start a workflow on those files.

After uploading them, the access point deletes these files from the FTP site. However, the folders (and subfolders) are not deleted. This way, the folder structure of FTP site stays intact.

> **Note:** The **Pilot** also offers a manual way to upload files from an FTP site. When you right-click on a folder or Job Folder, the function **Upload from FTP site** is offered. This **FTP Access Point** is an automated version of that feature.

3.2.2. Creating or modifying an FTP Access Point

Follow these steps to create or modify **FTP Access Points**:

1. In the **Automation Engine Pilot** go to the **Access Points** View. Alternatively, choose **Tools** > **Access Points**.

2. In the dedicated **Access Points** View, click on [icon]. Alternatively, choose **File** > **New**.

3. In the resulting window, select **FTP** and click **OK**.
   The **New FTP Access Point** window will open. Here is one with some typical settings already filled in:
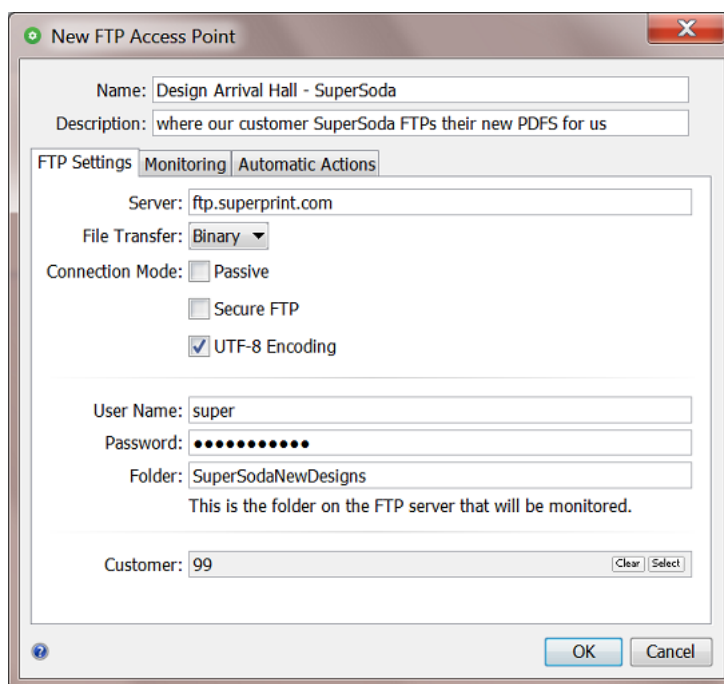
4. Enter a **Name** for the **Access Point**.

5. If you want, enter a **Description**.
   This will help identifying your **Access Point** without having to read all its settings.

6. In the tab **FTP Settings**, define where and how you wish to connect.

   - **Server**: Enter the name of the FTP server.

   - **File Transfer**: Choose either **Binary** or **ASCII**.

   > **Tip:** **Binary** will always work, but if you have an ASCII file, the transfer speed will be higher when you choose **ASCII**.

- **Connection Mode**:

    - Select **Passive** if there is a firewall between the FTP server and Automation Engine that is blocking the FTP server from setting up connections to Automation Engine.

        Tip: By default, the FTP transfer uses Active Connection Mode (where the FTP server opens the data connection). When **Passive** is selected, the system will use Passive Connection Mode instead (where the client initiates the connection).

    - Select **Secure FTP** if you are connecting to a secure FTP server (over FTPS, not SSL or SSH). If you are experiencing problems using secure FTP, try connecting over regular FTP and ask your IT administrator to check the security settings of your FTP server.

    - Select **UTF-8 Encoding** to avoid encoding problems in file names. For example when downloading file names with French characters onto a Chinese FTP server.

- **Advanced**: Select **Relax reply parsing** to get FTP scanning working when it interacts with an FTP server that does not fully comply to the communication standards when replying.

    The 'exception' error that this can solve will mention state a `MalformedServerReplyException: Truncated server reply: '220 '` and you will see this message " `the remote FTP server malformed a reply` "

- **User Name** and **Password**: Enter a valid user name and password for this FTP server.

- **Folder**: This is the folder on the FTP server that will be monitored. As mentioned in *Concept* on page 20, also its subfolders will be monitored.

- **Customer**: If you want to link a specific customer to this Access Point, use **Select** to pick it from the list. Then you can use it as a SmartName.

7. In the tab **Monitoring**, define the time interval.

    - **Check Every**. Enter the time interval with which Automation Engine should check if any new files came in. Think of the time interval as the *maximum* time it takes for the new files to be picked up.

    - **Schedule**. If you want this Access Point to be inactive during a part of the day, then select this option and indicate the start and end time of that period.

        Note: Such a temporary inactive state will not be shown in the general Access Points View. In that View, the column 'Active' shows its *general* status.

8. In the tab **Automatic Actions**, define what needs to happen.

    - **Move Files to**.

        - **Folder**. Indicate where you want the files to be moved to. Browse to a folder in a **Container**.

            Important: If this destination folder is part of a Job Folder, the workflow that this access point launches will run in the context of that Job.

        - **Customer's Upload Folder**. Alternatively, you can choose to move these files to the **Customer's Upload Folder**. This is a folder you can define in the definition of the **Customer**.

- **Rename Files to**. If you want you can choose to rename these files too. To do this, enter the new file name.

> **Tip:** Typically, SmartNames are used here to help indicate in their name *when* they were processed or *where* they came from.

- **Action**. Choose:

  - **None**. Choose this option when you *only* want to use this **Access Point** to *move* the files.

  - **Workflow**. Choose this option when you also want a workflow to start. Select the workflow ticket from the offered list. The new accessed files will be used as input files for this workflow. If these files are inside a Job Folder, the workflow will be run in the context of that Job.

    > ⚠ **Attention:** Make sure your workflow **can** start with the type of files that will arrive.

    Options:

    - **Operator**: choose the operator that will be shown as operator for the workflow task.

      > **Tip:** if you do not want to assign one specific person, you could create an operator named "Access Points" or "Automatic" and assign that one here. Also remember that the Access Points Task Monitor shows you the tasks launched by the selected Access Point.

    - **Priority**: choose the priority for this workflow: Low, Normal or High. The default priority is 'Normal'.

  - **Process JDF**. Choose this option when this Access Point will be used to process incoming JDF files. For more info on JDF, read *What about JDF?* on page 8.

3.3. SFTP Access Point

Concept

An **SFTP Access Point** monitors a folder on an SFTP site. At a regular time interval, it checks if new files have arrived in that folder and then moves them to a specified folder in an Automation Engine **Container**.

This also works for new files in any subfolders of the scanned SFTP site. By default, those files will be moved to an identical structure of subfolders that will be automatically created (learn more options below).

After downloading them, the access point deletes these files from the SFTP site. The folder structure on the SFTP site is kept.

An SFTP access point can also start a workflow on those files.

There is also a task that serves to upload files from within a container to such an SFTP site. Learn more in *Upload via SFTP* on page 44.

> **Note:** The difference between SFTP and FTP(S):
>
> **FTPS** (secure FTP) is the FTP protocol on top of SSL (similar to how HTTPS is the SSL secure version of HTTP). Do not confuse FTPS with SFTP, which uses SSH (secure shell). **SFTP** is seen as more reliable and secure and can also solve issues with firewalls. Learn more in this *online article describing the difference between FTPS and SFTP*.

Creating or modifying an SFTP Access Point

Most steps and options are equal to those described for an *FTP Access Point*. When creating one, select the type **SFTP**.

In the setup dialog, click **Configure...** for direct access to the *SFTP sites item in the Configure tool*. This configure item is where you manage the specifics of the SFTP authentication.

Creating and Copying Folder names

In many cases, not just the name of the file is interesting, but also the place where it was stored on the SFTP server. It might therefore be useful to re-use (parts of) that folder structure on the Automation Engine container. The folder names can also contain many other forms of information: their name might reflect the customer name, job order ID, production category, etc.

Learn about how to re-use the names of those remote folders and combine them with SmartNames *in this section describing the same possibilities for the cloud storage access points*.

.

File and Folder Name Limitations

- *Windows' "reserved characters"* are not supported, nor in the name of the destination folder nor in the names of the files that you download. See their list *here*.

- Non ASCII characters (ASCII = a-z, A-Z, 0-9) are only supported if the SFTP server you are downloading from uses UTF8 encoding.

3.4. Mail Access Point

3.4.1. Concept

A **Mail Access Point** scans an e-mail account and extracts the e-mail attachments of new incoming e-mail. These files are uploaded to a folder in a **Container**. A **Mail Access Point** can also start a workflow on those files.

Here are 2 typical examples of how **Mail Access Point** SmartNames can help you do even more:

- You can agree with the e-mail sender to start the subject line with the Job number. This helps you direct these files to the right folder.

- The address of the e-mail sender can be used to later send him an e-mail back about the status of the files he sent.

3.4.2. Creating or modifying a Mail Access Point

Follow these steps to create or modify **Mail Access Points**:

1. In the **Pilot** click on **Access Points** view. Alternatively, choose **Tools** > **Access Points**.

2. Click on ⬇ to create a new **Access Point**. Alternatively, choose **File** > **New**.

3. In the resulting window, select **Mail** and click **OK**.
   The **New Mail Access Point** window will open up. An example:
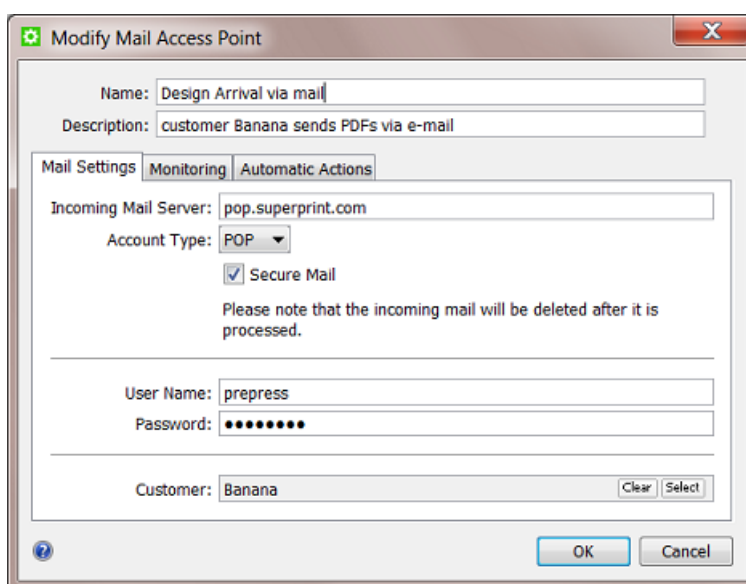
4. Enter a **Name** for the **Access Point**.

5. If you want, enter a **Description**.
   This will help identifying your **Access Point** without having to read all its settings.

6. Define the **Mail Settings**:
   Some examples:
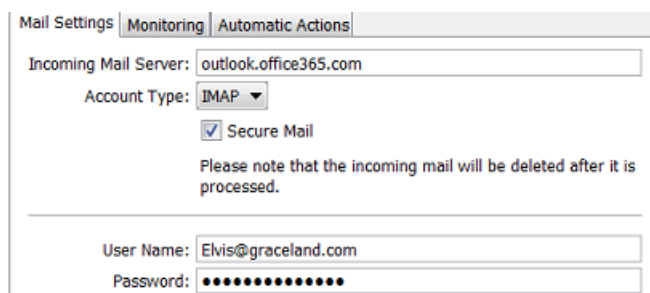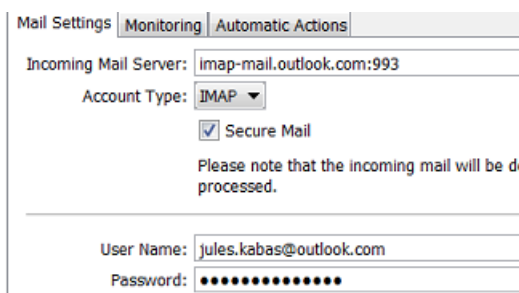
- **Incoming Mail Server**: Enter the name of the mail server.

- **Account Type**: Depending on the mailbox configuration, choose either **POP** or **IMAP**. See examples of both in above screenshots.

- **Secure Mail**: Select this if the mailbox is a secure type.

- **User Name** and **Password**: Enter the user name and password of the mail account that will receive the e-mails that you want to access.

- **Customer**: If you want to link a specific customer to this Access Point, use **Select** to pick it from the list. You can then use it as a SmartName.

7. In the tab **Monitoring**, define the time interval.

- **Check Every**. Enter the time interval with which Automation Engine should check if any new files came in. Think of the time interval as the *maximum* time it takes for the new files to be picked up.

- **Schedule**. If you want this Access Point to be inactive during a part of the day, then activate this option and indicate the start and end time of that period.

  Note: Such a temporary inactive state will not be shown in the general Access Points View. In that View, the column 'Active' shows its *general* status.

8. In the tab **Automatic Actions**, define what needs to happen.

- **Move Files to**.

  - **Folder**. Indicate where you want the files to be moved to. Browse to a folder in a **Container**.

    Important: If this destination folder is part of a Job Folder, the workflow that this access point launches will run in the context of that Job.

  - **Customer's Upload Folder**. Alternatively, you can choose to move these files to the **Customer's Upload Folder**. This is a folder you can define in the definition of the **Customer**.

- **Rename Files to**. If you want you can choose to rename these files too. To do this, enter the new file name.

  Tip: Typically, SmartNames are used here to help indicate in their name *when* they were processed or *where* they came from.

- **Action**. Choose:

  - **None**. Choose this option when you only want to use this **Access Point** to *move* the files.

  - **Workflow**. Choose this option when you want a workflow to start. Select the workflow ticket from the offered list. The new accessed files will be used as input files for this workflow. If these files are inside a Job Folder, the workflow will be run in the context of that Job.

    Attention: Make sure your workflow **can** start with the type of files that will arrive.

  Options:

- **Operator**: choose the operator that will be shown as operator for the workflow task.

  > **Tip:** if you do not want to assign one specific person, you could create an operator named "Access Points" or "Automatic" and assign that one here. Also remember that the Access Points Task Monitor shows you the tasks launched by the selected Access Point.

- **Priority**: choose the priority for this workflow: Low, Normal or High. The default priority is 'Normal'.

- **Process JDF**. Choose this option when this Access Point will be used to process incoming JDF files. For more info on JDF, read this section: *What about JDF?* on page 8.

3.5. Database Access Point

3.5.1. Concept

A **Database Access Point** reads, at a regular time interval, information from an external database. That information is written into one or more XML files. The **Database Access Point** can also start a workflow.

A typical use case is checking an external system for a new status. That new status will be a reason for Automation Engine to start an action. For example: in that external database, when the status of a Job or Product is found on "preflight required", Automation Engine starts a preflight workflow. Or the output tasks will be started for all jobs that are found in a status "Jobs to expose".

> **Tip:** The chapter *Examples* on page 96 contains an example case of a **Database Access Point**.

To prevent that these statuses keep triggering these actions over and over again, the **Database Access Point** offers the choice to update or delete those (status) fields. For example: the status "Proof required" would be updated to "Proof started on Esko".

These use cases are often identical to those where an external system sends an XML file to Automation Engine. Here are some typical reasons to use a **Database Access Point** instead of such an XML transfer:

- The external system can not export the wanted data to XML. Or it would require an expensive intervention or an upgrade of the software version.
- Exporting an XML would be a manual action by a user of that external system. And all manual actions can be forgotten.

3.5.2. Creating or modifying a Database Access Point

Follow these steps to create or modify a **Database Access Point**:

1. In the **Pilot** click on **Access Points** view. Alternatively, choose **Tools** > **Access Points**.

2. Click on ⬇ to create a new **Access Point**. Alternatively, choose **File** > **New**.

3. In the resulting window, select **Database** and click **OK**.
The **New Database Access Point** window will open up. Here is one with some typical settings already filled in:
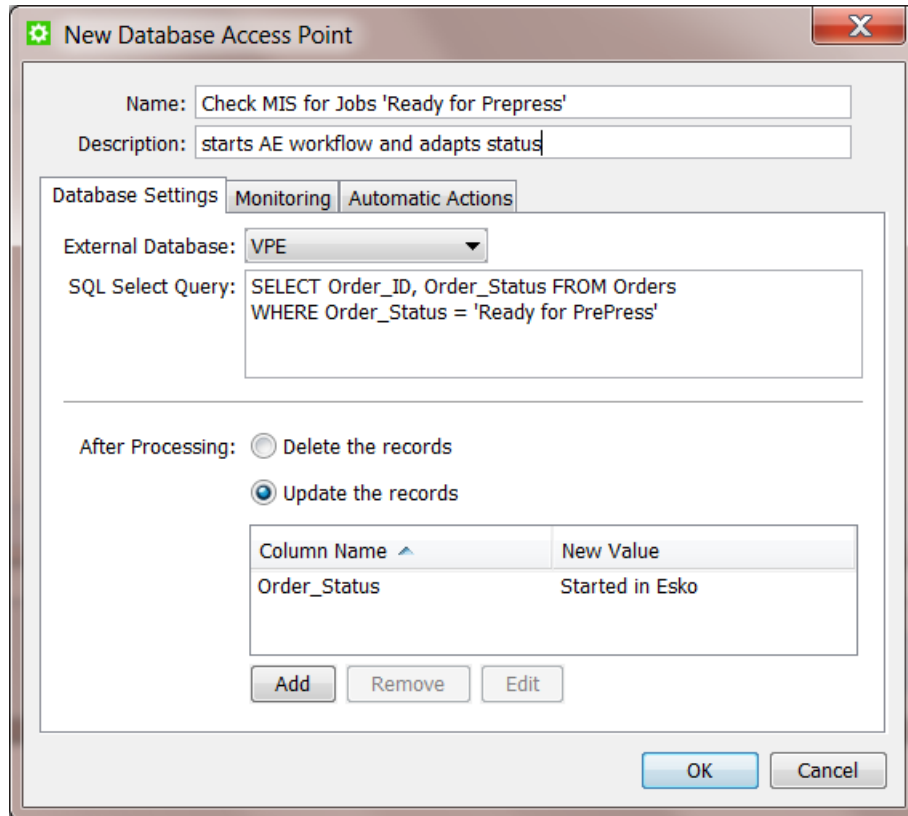
4. Enter a **Name** for the **Access Point**.

5. If you want, enter a **Description**.

   This will help identifying your **Access Point** without having to read all its settings.

6. Define the **Database Settings**:

   • **External Database**: Select the database from the list. The list shows the **External Databases** that you configured via **Tools** > **Configure**.

   • Enter the desired **SQL Select Query**: The query will search for records or it will search specific values in one or more columns. An XML file will be generated for each record that matches the query.

     Here is an example of a such an XML file. The query was looking for more info on Jobs with the status 'New'. This XML shows the resulting details of the Job 1213. See how the 'Select *' returned all the columns of the row of this Job 1213: name, operation etc...

```
?xml version="1.0" encoding="UTF-8?>
<design select="SELECT * FROM design WHERE status = "NEW"" producer="DBPoller-
MIS-1" created="2013-04-24T11:26:14.210+02:00">
    <id>1213</id>
    <name>MyDesign</name>
    <operation>CreateJobCard</operation>
    <width>12</width>
    <height>500</height>
```

```
      <depth>50</depth>
      <status>NEW</status>
</design>
```

Note: As soon as you select a **Database Access Point**, the query will be checked if it is valid. If it is not valid, an error message will be shown.

- **After Processing**: Now choose what should happen after the results from the query were processed.

  - **Delete the records**: This will delete the records that the query selected in the external database. It will make them empty.

  - **Update the records**: This will update the records that the query selected in the external database with a new value. Click on **Add** to update the desired parameters. Fill in the **Column Name** and the **New Value** in that database column and click OK.

    Note: If you want to update a record that contains a date and/or time, use the format **yyyyMMddHHmmss** for the new value of the column or use **now** to insert the date and time of the moment that the record is updated.

7. In the tab **Monitoring**, define the time interval.

- **Check Every**. Enter the time interval with which Automation Engine should execute this database query.

- **Schedule**. If you want this Access Point to be inactive during a part of the day, then activate this option and indicate the start and end time of that period.

  Note: Such a temporary inactive state will not be shown in the general Access Points View. In that View, the column 'Active' shows its *general* status.

8. In the tab **Automatic Actions**, define what needs to happen.

- **Move Files to**. Indicate where you want the resulting XML file(s) to be written. Browse to a folder in a **Container**.

  Important: If this destination folder is part of a Job Folder, the workflow that this access point launches will run in the context of that Job.

- **Rename Files to**. If you want you can choose to rename these files too. To do this, enter the new file name.

  Tip: Typically, SmartNames are used here to help indicate in their name *when* they were processed or *where* they came from.

- **Action**. Choose:

  - **None**. Choose this option when you want no further action.

  - **Workflow**. Choose this option when you also want a workflow to start. Select the workflow ticket from the list. If these files are inside a Job Folder, the workflow will be run in the context of that Job.

Attention: Make sure your workflow finds its input files. These can be the XML files from the query but that is not required.

Options:

- **Operator**: choose the operator that will be shown as operator for the workflow task.

  Tip: if you do not want to assign one specific person, you could create an operator named "Access Points" or "Automatic" and assign that one here. Also remember that the Access Points Task Monitor shows you the tasks launched by the selected Access Point.

- **Priority**: choose the priority for this workflow: Low, Normal or High. The default priority is 'Normal'.

3.6. Web Service Access Point

3.6.1. Concept

When a system has a web service, other software applications can send commands or queries to that system by using HTTP requests to the URL of the web service.

Note: This type of communication is a solution when the two systems you can not exchange (XML) files on hot folders. This is the case when the two systems are not in the same LAN or can't use shared folders due to security limitations.

Automation Engine also has a web server. A **Web Service Access Point** is a way for external systems to start workflows on Automation Engine by sending a command to the web service of Automation Engine.

Tip: In *this section on differences between Access Points*, you can read how a **Web Service Access Point** works somewhat different than the other types of Access Points. One important difference is that the **Web Service Access Point** does not use the concept of time intervals. It is the external system that fully decides **when** to send a command to Automation Engine.

The HTTP requests can be both HTTP POST requests and HTTP GET requests. If the HTTP POST request also 'posts' data files, then they will be used as input files for the workflow that will be started.

Note: When using a HTTP GET request, parameters of the web service call are encoded in the URL using HTTP query strings. When using HTTP POST requests, the parameters are encoded in the content part of the HTTP request.

Note: Automation Engine also offers tasks that can convert JSON data into XML and vice versa. Learn more in *Convert JSON to XML task* on page 48 and in *Convert XML to JSON task* on page 50.

3.6.2. Configuring and Checking the Automation Engine Web Service

Purpose

The web service of Automation Engine will be running automatically on the Automation Engine server.

Note: This web service is also used when you access the *Automation Engine Server Web Page* in a browser.

You can check the status of the Automation Engine Web Service by entering this in a browser: http://<name of your server>:<port>/ws/ . The port number is the one as defined in the **Configure** tool > **Automation Engine Web Service**. By default this port number is 4415.

For example: If your Automation Engine server is named `AESERVER1`, then the URL to enter in your browser is `http://aeserver1:4415/ws/`.

The web page that then appears offers more guidelines on formatting more detailed HTTP commands.

Security

To obtain more security, communicating with a Web Server can be encrypted. Encryption is done using the **private key** of a **certificate**. Decryption is done using the **public key** of a certificate.

Another way to obtain more security when communicating with a Web Server is to require authentication to get access to certain services. This means that one must prove that he is who he claims to be.

Settings

You have the choice to enable HTTP and/or to enable HTTPS. Usually, only one of the two is chosen.
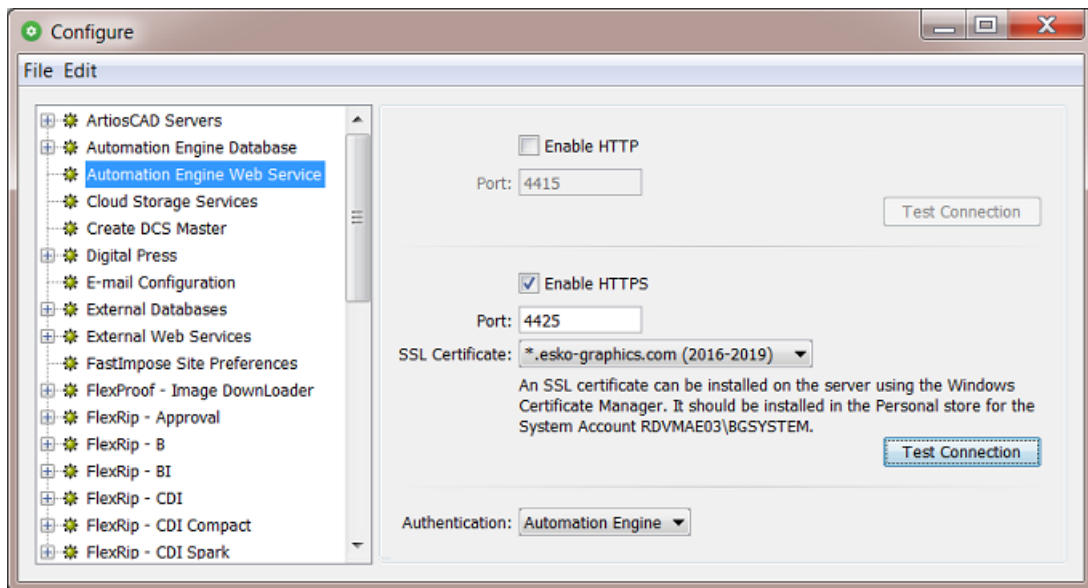
- **Enable HTTP**

  - Enter the correct **Port** number.

  - Click **Test Connection** to test it. The opens the default browser and issues a HTTP-GET command to the context of the Access Points. If the HTTP-GET succeeds, an HTTP-POST will most likely also be possible.

- **Enable HTTPS**

  HTTPS creates a secure channel over an insecure network. Learn more on *this wiki-page*.

  - Enter the correct **Port** number.

  - **SSL Certificate** (mandatory option): This is the official certificate that will do the encryption. The name mentioned here is its `'friendly name'`. This official certificate must be imported in 'Windows Certificate Manager' (certmgr.msc) in the 'Personal-Certificates' for the 'Service Account' of the (Master) Automation Engine server. This is typically the user 'BGSystem'.

    Note: To learn more on how to import a certificate in Windows Certificate Manager, consult the Microsoft documentation corresponding to your OS version.

    Attention: Automation Engine only supports the usage of officially trusted certificates (as signed by and to be bought from a Certificate Authority (CA) and to be imported in the Windows Certificate Manager.

  - Click **Test Connection** to test it. This opens the default browser and issues a HTTP-GET command to the context of the Access Points.

    If the HTTP-GET succeeds (SSL-Handshake + Authentication if configured), an HTTP-POST will most likely also be possible.

    For HTTPS, the FQDN (fully qualified domain name) for the AE master server is calculated (DNS) and used in an attempt to use a host name that better matches the certificate.

- **Authentication**: Choose here whether the web service requires an authentication.

  - **No** authentication.

- "**Automation Engine**" authentication. In this case, users must authenticate with the 'AE LogonServer'. This means they need to use the same credentials as when they log on to the Pilot. User names should adhere to this form: `user@aeserver`, For example `admin@AEserver01`.

Note: Only the 'BASIC' HTTP authentication protocol is supported.

3.6.3. Creating a Web Service Access Point

Note: Setting up a **Web Service Access Point** is simple. The complexity lies in the content of the HTTP requests that are sent to it (see next pages).

Follow these steps to create a **Web Service Access Point**:

1. In the **Pilot** click on **Access Points** view. Alternatively, choose **Tools** > **Access Points**.

2. Click on ⬇⁺ to create a new **Access Point**. Alternatively, choose **File** > **New**.

3. In the resulting dialog, select **Web Service** and click **OK**.
   The **New Web Service Access Point** dialog will open up. Here is one with some typical settings already filled in:
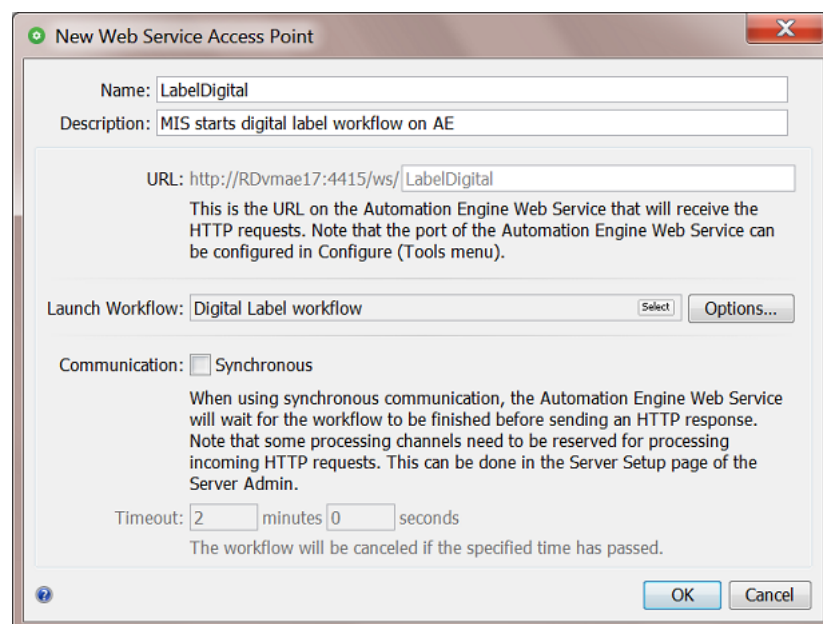
4. Enter a **Name** for the **Access Point**.

   This name will automatically be used to complete the URL for this Access Point.

5. If you want, enter a **Description**.

   This will help identifying your **Access Point** without having to read all its settings.

6. See the resulting URL. This is where the external system needs to send its command to launch the workflow defined below.

7. Select the **Workflow** that this Access Point will start.

Options:

- **Operator**: choose the operator that will be shown as operator for the workflow task.

  > **Tip:** If you do not want to assign one specific person, you could create an operator named "Access Points" or "Automatic" and assign that one here. Also remember that the Access Points Task Monitor shows you the tasks launched by the selected Access Point.

- **Priority**: choose the priority for this workflow: Low, Normal or High. The default priority is 'Normal'.

8. In **Communication**, define if you want this Access Point to use synchronous communication.

   - When the web service is **asynchronous**, the workflow is added to the tasks queue like any other workflow that is started manually or automatically. The web service responds to the caller immediately after adding the workflow to the queue with a standard message mentioning the task-id of the queued workflow. The web service will not wait for the workflow to execute and finish. See some examples of such a response in *HTTP Responses* on page 38.

   - When the web service is **synchronous**, the web service only responds to the caller when the workflow is finished. In this case the response is the result of that workflow, its output files. See some examples of such a response in *HTTP Responses* on page 38.

     Main benefit here is that the user of the external system (the caller) gets a fast response with the file(s) or information he asked for. For example: the user of the external system selects an ArtiosCAD design and asks Automation Engine to calculate a specific sheet layout. Seconds later, this user sees the detailed information about the resulting sheet because his system read the metadata of the MFG that the workflow created. This then helps the user to calculate the cost of this type of layout.

     > **Attention:** One or more of the Automation Engine server's processing channels should be reserved for processing these incoming HTTP requests. This avoids that the response is delayed because of other tasks. Learn more in the **Automation Engine Server Web Page**, in the *Server Setup* page of the section **Server Admin**.

   Timeout: When the external system has not received a response after this time, the workflow will be cancelled.

3.6.4. HTTP POST Requests

Launching a workflow using an HTTP POST request

The HTTP POST requests must meet the following requirements:

- The value of the **Content-Type** header of the HTTP POST request should be, in most cases, **multipart/form-data**.

- HTTP request parts can be added to the HTTP POST requests to attach data files and/or to add parameters (also see further).

- For every HTTP request part that is added to an HTTP POST request, a **Content-Disposition** header should be present.

- For each data file, the (UTF-8 encoded) file name of the data file should be specified in the corresponding **Content-Disposition** header.

- For each parameter, the name of the parameter should be specified in the corresponding **Content-Disposition** header.

- The encoding of the HTTP POST requests should be **base64** or no encoding (for example **binary**, **8bit**,...).

For example:

```
POST /ws/myFavoriteWorkflow HTTP/1.1
Host: aeserver01:4415
Content-Type: multipart/form-data; boundary=---------------------146677a63ef
Content-Length: <length of request body in octets (8-bit bytes)>
...
---------------------146677a63ef
Content-Disposition: form-data; name="wfparam1"

2mm
---------------------146677a63ef
Content-Disposition: form-data; name="wfparam2"

4mm
---------------------146677a63ef
Content-Disposition: form-data; name="inputfile1"; filename="inputfile1.pdf"
Content-Transfer-Encoding: binary

<binary contents of inputfile1.pdf>
---------------------146677a63ef
Content-Disposition: form-data; name="inputfile2"; filename="inputfile2.pdf"
Content-Transfer-Encoding: binary

<binary contents of inputfile2.pdf>
```

Attaching data files to be used as input files for the workflow that is launched

You can attach data files to be used as input files for the workflow that is launched by adding them as HTTP request parts to the HTTP POST request. For each data file, the (UTF-8 encoded) file name of the data file should be specified in the corresponding **Content-Disposition** header.

For example:

```
POST /ws/myFavoriteWorkflow HTTP/1.1
Host: aeserver01:4415
Content-Type: multipart/form-data; boundary=---------------------146677a63ef
Content-Length: <length of request body in octets (8-bit bytes)>
...

---------------------146677a63ef
Content-Disposition: form-data; name="inputfile1"; filename="inputfile1.pdf"
Content-Transfer-Encoding: binary

<binary contents of inputfile1.pdf>
...
```

When the workflow is launched, the data files are handled in one of the following ways:

- When the workflow is launched in a specific Job, the data files will be moved to the Job Folder.
- When the workflow is not launched in a specific Job and the workflow is successfully finished, the data files will be deleted.

- When the workflow is not launched in a specific Job and the workflow did not finish successfully, the data files will be kept in this shared folder:

```
\\<name of your server>\AutomationEngineTmpFolder
```

When no data files are attached to the HTTP POST request, the **Web Service Access Point** will generate an XML file containing some information about the HTTP GET request. This XML file will then be used as input file for the workflow to be launched and will be handled in the same way as attached data files would be handled.

Launching a workflow with only a single input file ('PLAIN POST')

Since AE 16.1, you can also POST a PLAIN file, rather than a `multipart` post containing the file(s).

For example:

```
POST /ws/myFavoriteWorkflow HTTP/1.1
Host: aeserver01:4415
Content-Type: text/xml
Content-Length: <size of inputfile>

<binary contents of inputfile>
```

Launching a workflow in a specific Job

You can specify the Job in which the workflow should be launched by adding parameters as HTTP request parts to the HTTP POST request. The name of each parameter should be specified in the corresponding **Content-Disposition** header.

The Job in which the workflow should be launched can be specified using the **Job ID**, the **Job Name**, the **Order ID** or using both the **Order ID** and the **Sub Order ID**. The parameters you need to add as HTTP request parts to the HTTP POST request are, respectively, **jobid**, **jobname**, **orderid** or **orderid** and **suborderid** . The values for these parameters should be UTF-8 encoded.

For example:

```
POST /ws/myFavoriteWorkflow HTTP/1.1
Host: aeserver01:4415
Content-Type: multipart/form-data; boundary=---------------------146677a63ef
Content-Length: <length of request body in octets (8-bit bytes)>
...

---------------------146677a63ef
Content-Disposition: form-data; name="orderid"

2014-100254
...
```

Specifying the values of the workflow parameters of the workflow that is launched

You can also set the values of the workflow parameters of the workflow by adding parameters as HTTP request parts to the HTTP POST request. These parameters should have the same names as the names of the workflow parameter(s) which value you want to set. The values for these parameters should be UTF-8 encoded . For each parameter, the name of the parameter should also be specified in the corresponding **Content-Disposition** header.

For example:

```
POST /ws/myFavoriteWorkflow HTTP/1.1
Host: aeserver01:4415
Content-Type: multipart/form-data; boundary=---------------------146677a63ef
Content-Length: <length of request body in octets (8-bit bytes)>
...

---------------------146677a63ef
Content-Disposition: form-data; name="wfparam1"

2mm
...
```

3.6.5. HTTP GET Requests

Launching a workflow using an HTTP GET request

When using HTTP GET requests to launch workflows on a **Web Service Access Point**, no data files can be attached.

Every time an HTTP GET request is received on the URL of the **Web Service Access Point**, it will generate an XML file containing some information about the HTTP GET request. This XML file can then be used as input file for the workflow to be launched.

- When the workflow is launched in a specific Job, this XML file will be moved to the Job Folder.
- When the workflow is not launched in a specific Job and the workflow is successfully finished, this XML file will be deleted.
- When the workflow is not launched in a specific Job and the workflow did not finish successfully, this XML file will be kept in this shared folder:

  ```
  \\<name of your server>\AutomationEngineTmpFolder
  ```

Launching a workflow in a specific Job

You can specify the Job in which the workflow should be launched by adding parameters to the query string of the HTTP URL. The Job in which the workflow should be launched can be specified using the **Job ID**, the **Job Name**, the **Order ID** or using both the **Order ID** and the **Sub Order ID**. The parameters you need to add to the query string of the HTTP URL are, respectively, **jobid**, **jobname**, **orderid** or **orderid** and **suborderid**. The values for these parameters should be UTF-8 encoded.

For example:

```
http://aeserver01:4415/ws/myFavoriteWorkflow?jobid=ee6b08ca-eecf-4cb7-b2e1-254c20d82546
http://aeserver01:4415/ws/myFavoriteWorkflow?jobname=Libelle-2014-week12
http://aeserver01:4415/ws/myFavoriteWorkflow?orderid=2014-100254
http://aeserver01:4415/ws/myFavoriteWorkflow?orderid=2014-100255&suborderid=001
```

Specifying the values of the workflow parameters of the workflow that is launched

You can also set values for workflow parameters by adding parameters to the query string of the HTTP URL. These parameters should have the same names as the names of the workflow parameter(s) which value you want to set. The values for these parameters should be UTF-8 encoded .

For example:

```
http://aeserver01:4415/ws/myFavoriteWorkflow?wfparam1=2mm
http://aeserver01:4415/ws/myFavoriteWorkflow?wfparam1=2mm&wfparam2=4mm
http://aeserver01:4415/ws/myFavoriteWorkflow?jobname=Libelle-2014-week12&wfparam1=2mm
```

3.6.6. HTTP Responses

> ⚠️ **Attention:** When using a **Web Service Access Point**, the corresponding HTTP responses should always be checked because they can contain error messages.

As mentioned earlier, the response is different if the communication is *synchronous or asynchronous.*

Asynchronous Communication Responses

- In case the workflow was successfully launched, the HTTP response will contain the task ID of the workflow task that was launched.

  An example:

  ```
  <?xml version="1.0" encoding="UTF-8"?>
  <message>
      <response>taskid=dd145a15-49bb-4625-a0da-6d3aee663ae3</response>
  </message>
  ```

- In case the workflow could not be launched successfully and/or an error occurred, the HTTP response will contain one or more error messages.

  An example where the workflow ticket could not be found:

  ```
  <?xml version="1.0" encoding="UTF-8"?>
  <message>
      <error>
          <code>-110</code>
          <msg>Problem loading ticket: swft/Web Service Access Point Test WF</msg>
      </error>
  </message>
  ```

Synchronous Communication Responses

The response depends on what the workflow created:

- When the workflow task created one file, it will return that one file. An example of such a response where one PDF was created (see the response header as captured from a browser's "network traffic" view after launching the call from that browser):


  ```
  ▼ Response headers (0.116 KB)
      Content-Length: "18476"
      Content-Type: "application/pdf;charset=UTF-8"
      Server: "Jetty(7.4.2.v20110526)"
  ```

- When the workflow task created multiple files, it will return a MIME file containing them. An example of such a response:

- When the workflow task did not create any output files (in an OK status), the response mentions this as a remark:

```
<message>
 <response>taskid=def75756-ad52-42ac-829e-93a7a90d2741
        <remark>WorkFlow produced no OK-outputs.</remark>
 </response>
</message>
```

3.7. Esko Cloud Access Point

This type is described in the chapter "*Collaborating via Esko Cloud*".

Find a direct link *here*.

3.8. Cloud Storage Access Points

3.8.1. Concept and Generic Options

Concept

A cloud storage access point scans a folder "in the cloud" and downloads (moves) any new files that appear in that folder or its subfolders onto a folder inside an Automation Engine Container. The downloaded files are removed from the cloud storage. The access point can also start a workflow on those files.

Note: There is also a *task that can upload data from within an Automation Engine container to such a cloud storage folder*.

Attention: Windows' "reserved characters" are not supported, nor in the name of the destination folder nor in the names of the files that you download. Learn more *here*.

Automation Engine supports these cloud storage providers: *Box*, *Google Drive*, *OneDrive* and *Amazon S3*.

Attention: *OneDrive for Business* is not supported.

Before you can use such an access point, you need to *configure one or more account authorizations in the Configure tool*.

Generic Options

We here illustrate the options that most providers have in common. Any specifics per provider are mentioned in their dedicated pages hereafter.

- The first steps to create a cloud storage access point are very similar to creating any other access point. See an example of the detailed steps in *the first 5 steps of this page*.
- In the **Settings** tab of the provider:

  - **Account**. Choose an account from the list that you first added in *the Configure tool*. Only the accounts for the selected provider are shown. Click **Configure** to see or create that configuration.
  - **Folder**. By default, this is the account's home directory. Remember that subfolders of the specified folder are also scanned. When you do not want all these folders scanned, you can specify a subfolder, for example " `/PrePressData`". Then, only all data in that folder and its subfolders will be scanned.

    Learn more below about options to use or replace (parts) of this path in the destination path.
- In the tab **Monitoring**: These options are identical to those explained *here*.
- In the tab **Automatic Actions**: Downloaded files with a same name are overwritten. The options are identical to those explained *here*.

Creating and Copying of Folder Names

In many cases, not just the name of the file is interesting, but also the place where it was stored on the cloud storage. It might therefore be useful to re-use (parts of) that folder structure on the Automation Engine container. The folder names can also contain many other forms of information: their name might reflect the customer name, job order ID, production category, etc.

An example: we assume the following situation and then illustrate several possibilities in the below table:

- On the cloud storage, the home directory of the used account contains " `SuperBeer/bottle/blond33.pdf` "
- We want to move the new found files onto " `file://AEserver/Data1/FromTheCloud`".
- You can use " `/@-<number>` " to specify how many cloud storage folder levels you do *not* want to copy from the cloud path onto the new one. To make sure you do not copy any parts at all of the cloud path, you can for example enter " `/@-99`".

Table: Different cases based on above example:

"Folder" in the tab "\<provider> Settings"	"Move Files To" in the tab "Automatic Actions"	Result
empty or " `/` "	file://AEserver/Data1/FromTheCloud	file://AEserver/Data1/FromTheCloud/SuperBeer/bottle/blond33.pdf
" `/@-1` "	file://AEserver/Data1/FromTheCloud	file://AEserver/Data1/FromTheCloud/bottle/blond33.pdf
" `/@-2` "	file://AEserver/Data1/FromTheCloud	file://AEserver/Data1/FromTheCloud/blond33.pdf
" `/@-2` "	file://AEserver/Data1/FromTheCloud/ [First Folder of File]	file://AEserver/Data1/FromTheCloud/SuperBeer/blond33.pdf

"Folder" in the tab "<provider> Settings"	"Move Files To" in the tab "Automatic Actions"	Result
"/@-2"	file://AEserver/Data1/ FromTheCloud/[Folder of File]	file://AEserver/Data1/FromTheCloud/bottle/ blond33.pdf

Note: Above example is also valid for the FTP and SFTP access points.

3.8.2. Google Drive Access Point

The options for a *Google Drive* access point are identical to those for the other cloud storage providers.

Learn more in the section *Generic Options*.

3.8.3. Box Access Point

The options for a *Box* access point are identical to those for the other cloud storage providers.

Learn more in the section *Generic Options* on page 40.

3.8.4. OneDrive Access Point

The options for a *OneDrive* (Personal Cloud Storage) access point are identical to those for the other cloud storage providers.

Learn more in the section *Generic Options* on page 40.

> ⚠️ **Attention:** *OneDrive for Business* is not supported.

3.8.5. Amazon S3 Access Point

Many options for an *Amazon S3* access point are identical to those for the other cloud storage providers. Learn more in the section *Generic Options* on page 40.

The tab '**Amazon S3 Settings**' contains an extra option '**Bucket**'. This is Amazon's term for "root folder".

- **Bucket**: This is a mandatory field to define the root folder. All subfolders will be scanned, unless you define another folder in the option below. Example: `Pharmadata.Chicago.Superprint`.

- **Folder**: When you here specify a folder (one that resides in the **Bucket** defined above), then that is the one will be scanned (and all it subfolders).

3.9. SAP Access Point

The **SAP** access point and the **Interact with SAP** task serve to integrate with an ERP system from *SAP*.

Such integrations are managed through assistance from *Esko Solution Services*.

4. Upload tasks

These tasks enable to upload data from within an Automation Engine Container to an FTP site or to a cloud storage (application).

Before you can use these, you need to configure their connection in the *Configure tool*.

4.1. Upload via FTP

This task allows to upload files to a folder on an FTP server. You need to have an FTP account on that server. You can use the task to send the files to more than one FTP location.

1. In the task ticket, click **New...** to define a location. The **Edit FTP Location** dialog pops up.

2. **Connection**:

    •   **Host**: the name of the server you want to send your files to.

        Tip: To use a port other than the default port, add `:` and the port number after the host name. For example: `myftpserver:1085`

    •   **Folder**: Specify a FTP folder. When this field is empty, the files will be stored on the default directory.

        Tip: Using SmartNames to help you to organize the arriving data.

- **Connection Timeout**: (By default 30.000 milliseconds). You only need to increase this value if you are working on a slow network and keep getting time out errors.

- **Secure FTP**: Select this if you are connecting to a secure FTP server (over FTPS)

   Tip: If you are experiencing problems using secure FTP, try connecting over regular FTP, and ask your IT administrator to check the security settings of your FTP server.

   Tip: FTPS (secure FTP) is the FTP protocol on top of SSL (similar to how HTTPS is the SSL secure version of HTTP). Do not confuse FTPS with SFTP, which uses SSH (secure shell). *Uploading files via SFTP* is therefor a different task, which is more reliable and can also solve issues with firewalls.

- **UTF-8 Encoding**: Select this to avoid encoding problems in file names. For example when sending French file names to a Chinese FTP server.

3. Enter the **User name and password** that allows you to connect to that FTP server:

   Tip: To avoid that you have to change this ticket every time the password (and user name) changes, it might be useful to use SmartNames. This help for example when the user name and password is stored centrally and when SmartNames can retrieve their value via an *SQL query*.

4. **File** uploading settings:

- **File Transfer**: Binary will always work, but if the file(s) you send are ASCII file(s), then the transfer will go a bit faster when selecting ASCII.

- **If File Exists**:

  - **Overwrite and give warning**: The file will be overwritten, but the tasks finishes in the state `Warning`.

  - **Overwrite**: This will just overwrite the file and the tasks finishes OK.

  - **Generate a unique file name**: This will append the task ID to the file name, and store the file at the destination under its unique name.

  - **Generate an error**: The file will not be sent, the task will fail.

- **Connection Mode**: By default, the transfer uses **Active** connection mode (where the FTP server opens the data connection).

   When your system is behind a firewall that blocks incoming FTP server connections, select **Passive** connection mode (where the client initiates the connection).

4.2. Upload via SFTP

Concept

This task uses SFTP to upload files from within an Automation Engine Container to a folder on a host that runs an SSH-Server. When a file already exists on the destination folder, it is overwritten.

Note: IT security may require that you use this protocol i.s.o. *FTP(S)*. Learn more in this *online article describing the difference between FTPS and SFTP*.

> ⚠ **Attention:** The task takes care of the client side. Esko does not provide information on how to set up an SSH server.

Note: SFTP is often used to send files to a Mac OS computer.

Settings

- **Server**: Select a configured SFTP server. Click **Configure...** to open the *SFTP sites topic in the Configure panel.*

- **Folder**: When you leave this field empty, the files will be sent to the user's home directory. When you specify a folder, it will be a subfolder of the user's home directory. Use a slash to define extra subfolder(s), for example `FromAE/pharma1` or include SmartNames: `FromAE/[Date]/[Job ID]` or `FromAE/[Date]/[Folder of File]`.

  > ⚠ **Attention:**
  >
  > - *Windows' "reserved characters"* are not supported, nor in the name of the destination folder nor in the names of the files that you upload. See their list *here*.
  >
  > - Non ASCII characters (ASCII = a-z, A-Z, 0-9) are only supported if the SFTP server you are uploading to supports UTF8 encoding.
  >
  > - When the task is canceled, the task continues uploading the current file but does not start uploading the next input file.
  >
  > - Files with a size greater than 150 MB can not be uploaded reliably.

- **If Folder Does Not Exist**: When the destination folder does not exist,

  - select **Create Folder** when you want to have it created. The same happens when you **Select a SmartName** that returns the value "`1`".

  - select **Task Fails** to not have it created and end the task in error. The same happens when you **Select a SmartName** that returns the value "`0`".

4.3. Upload To Cloud Storage

This task uploads files from within an Automation Engine Container to a folder on a cloud storage service (Box, Google Drive or OneDrive).

> ⚠ **Attention:** This task does not upload to Esko Cloud. Learn about the dedicated tasks and tools in the chapter *Collaborating via Esko Cloud*.

Settings

- **Account**: Select the cloud storage account that you configured earlier. Click **Configure...** to access *that item in the Configure tool*.

- **Bucket** (Amazon S3 only). This is a mandatory field to define the root folder. All subfolders will be scanned, unless you define another folder in the option below. Example: `Pharmadata.Chicago.Superprint`.

- **Folder**: Define the folder where you want to upload the files. When you leave this field empty, the files are uploaded to the account's home directory.

   Note: (Amazon S3 only): When you here specify a folder (one that resides in the **Bucket** defined above), then that is the one that will be scanned (and all it subfolders).

   When you specify a folder, it will be a subfolder of the account's home directory.

   Note: Use a slash to define extra subfolder(s), for example `FromAE/pharma1` or include SmartNames: `FromAE/[Date]/[Job ID]` or `FromAE/[Date]/[Folder of File]`.

   Attention:
   - This path needs to *URL encoded*. *Windows' "reserved characters"* are not supported, nor in the name of the destination folder nor in the names of the files that you upload. These characters are
      - < (less than)
      - > (greater than)
      - : (colon)
      - " (double quote)
      - / (forward slash)
      - \ (backslash)
      - | (vertical bar or pipe)
      - ? (question mark)
      - * (asterisk)
   - When the task is canceled, the task continues uploading the current file but does not start uploading the next input file.
   - Files with a size greater than 150 MB can not be uploaded reliably.

   Attention: When you upload a same file again to the same folder, the result depends on the type of cloud storage application:
   - **Google Drive**
      - A new version is added.
      - The '`Modified`' date is the date of the uploaded file.

   - **Box**
      - A new version is added.
      - The '`Modified`' date is the date of uploading.

   - **OneDrive** and **Amazon S3**
      - The newly uploaded file overwrites the old file.
      - The '`Modified`' date is the date of uploading.

- **If Folder Does Not Exist**: When the destination folder does not exist,

- select **Create Folder** when you want to have it created. The same happens when you **Select a SmartName** that returns the value "1".

- select **Task Fails** to not have it created and end the task in error. The same happens when you **Select a SmartName** that returns the value "0".

5. Data Transforming Tasks

We introduced the concept of these tasks in the chapter *Automation Engine Mapper tasks Transforming Data* on page 12.

> ⚠ **Attention:** These types of tasks require good knowledge of SmartNames.

> ⚠ **Attention:** The **XPath Builder** makes it a lot easier to extract parts from XML files. This tool is documented in a *separate chapter on SmartNames*.

5.1. Convert JSON to XML task

Concept

JSON stands for 'JavaScript Object Notation'. Learn more on *https://en.wikipedia.org/wiki/JSON* or *http://www.json.org/fatfree.html*.

When Automation Engine is to *receive* information from a web service, that application may prefer to directly send JSON data to Automation Engine in stead of first converting it into the more generic XML format.

The JSON file could be of the JSON 'Object' type or of the JSON 'Array' type. This task can convert such JSON data into corresponding XML data, the format that Automation Engine has many tools for.

> **Note:** When Automation Engine needs to *send* data to a web service, it can also convert XML data to JSON data. Learn more in *Convert XML to JSON task* on page 50.

JSON sample

- **JSON Object**: An 'object' starts and ends with '{' and '}'. Between them, a number of string value pairs can reside. String and value is separated by a ':' and if there is more than one string value pair, they are separated by ','.

  Syntax:

  ```
  { key: value, .......}
  ```

  Example:

  ```
  { "companyName": "Esko", "location": "Bangalore", "email":"admin@esko.com" }
  ```

  In JSON, objects can nest 'arrays' (which start and ends with '[' and ']') within it. An example:

  ```
  { "Companies": [{ "Name":"Esko" ,"Location":"Bangalore" },
   { "Name":"Danaher" ,"Location":"US" } ] }
  ```

- **JSON Array**: An 'array' starts and ends with '[' and ']'. Between them, a number of values can reside. If there is more than one value, they are separated by a ','.

  Syntax:

  ```
  [ value, .......]
  ```

  An example:

  ```
  [
      { "name": "Bidhan Chatterjee", "email": "bidhan@example.com"},
      {"name": "Rameshwar Ghosh","email": "datasoftonline@example.com"}
      ]
  ```

Task Options

- **Root Element Name**: Specify the name of the root element in the output XML. The default value is "ROOT".

- **Array Element Name**: Specify the element name for each JSON array item in the output XML. The default value is "ARRAY_ITEM".

The task will fail when the input XML file is not well formed.

The task automatically adds an extension .json to the output file. The output file will be in UTF 8 format.

Workflow Example

There are several examples when Automation Engine can get a response from a web service in JSON format.

One of them is the *Interact with Web Service task*. Its JSON output can so be converted to XML.

Also a *Web Service Access Point* could bring such JSON data.

Tip: With that type of Access Point, it might be enough to type an inline JSONPath expression to extract some (workflow) parameters. Learn more in *JSONPath Expressions*.

Conversion Example

See how the JSON (left) was converted to XML (right):

```
{
    "company_list":{
        "company":{
            "zip":233244,
            "country":"Hindustan",
            "Type_Code":"Type_COde",
            "Location_Name":"Bangalore",
            "address2":"#14- Esteem tower, railway road",
            "city":"chennai",
            "phone":9625342772,
            "address1":"Shivajinagar",
            "Company_Name":"001_Insert_Company_With_Smartname",
            "state":"JH",
            "fax":38469,
            "Company_Number":"Esko"
        },
        "type":"Yes",
        "delete":"No",
        "key":"Company Name"
    }
}
```

```
<company_list>
    <company>
        <Company_Name>001_Insert_Company_With_Smartname</Company_Name>
        <Company_Number>Esko</Company_Number>
        <Type_Code>Type_COde</Type_Code>
        <Location_Name>Bangalore</Location_Name>
        <address1>Shivajinagar</address1>
        <address2>#14- Esteem tower, railway road</address2>
        <city>chennai</city>
        <state>JH</state>
        <zip>233244</zip>
        <country>Hindustan</country>
        <phone>9625342772</phone>
        <fax>38469</fax>

    </company>
    <key>Company Name</key>
    <type>Yes</type>
    <delete>No</delete>
</company_list>
```

5.2. Convert XML to JSON task

Concept

JSON stands for 'JavaScript Object Notation'. Learn more on *https://en.wikipedia.org/wiki/JSON*.

When Automation Engine is to send information to an external web service, that application may prefer to receive JSON data in stead of XML.

This task can convert XML into corresponding JSON data.

Note: When Automation Engine is *receiving* JSON data from an external web service, it can also convert JSON to XML. Learn more in *Convert JSON to XML task* on page 48.

Task Options

This task offers no options.

Workflow Example

A typical workflow would be to convert XML to JSON right before sending it to the external web application (using the *Interact with Web Service task*):


5.3. Create XML File task

The **Create XML File** task is typically used to export value from SmartNames to an external system.

Important: This task does not use its task input file to start building the XML from. The content of the XML that you will create is completely defined inside the task window.

Defining the content of the XML

The **Create XML File** task offers a blank canvas where you need to define all the content of the XML that you want to create. In below example you see a combination of self written XML code (blue) and some SmartNames (green). Click on **+ [ ] insert SmartName** to pick a SmartName from the list. Alternatively, right-click and choose a SmartName from the offered categories.
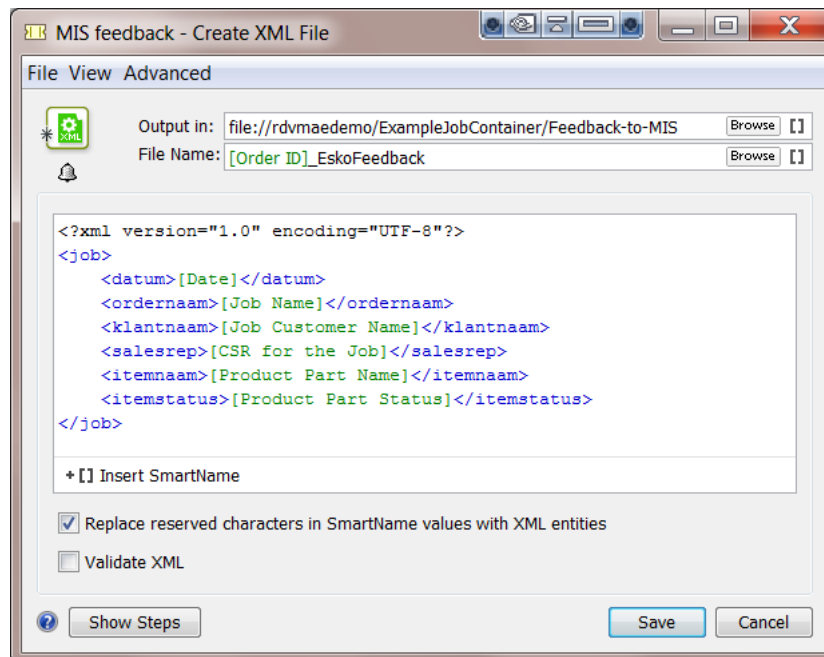
Note: The XML file has to start with an XML declaration. This line indicates the file encoding to the reading application. To add such a line, you can simply right-click and choose **Insert XML Declaration** to insert this industry default one: `<?xml version="1.0" encoding="UTF-8"?>`

Note: Any links to externally defined XML schema (for example a reference to a DTD or XSD) may influence performance. Preferably remove such links from the XML file.

- **Replace reserved characters in SmartName values with XML entities**: It is possible that the SmartName returns characters that are not allowed in XML. With this option, you choose to map these special characters mapped into these 'XML entities'. Below list shows these mappings:

Reserved characters in result value	Meaning	XML Entities
"	quotation mark	"
'	apostrophe	'
&	ampersand	&
>	greater than	>
<	smaller than	<

• **Task fails when output XML is not a valid XML file** : Enable this option to have Automation Engine check the validity of the XML. If this option is on, the task will fail if the XML is not valid. The validation checks the XML formatting and the XML tag endings.

Note: This task does not check XML schemas such as XSD, DTD, etc.

5.4. Map Data task

5.4.1. Concept

The **Map Data** task is a powerful tool that can be used to

• convert CSV files into XML and vice versa.
• transform the content of a CSV or XML file: extract, join, rename or re-format parts.

Note: A CSV or comma separated file is a structured text file. In such files commas or some other character are used as field separators. CSV can be generated by exporting an XLS file in Microsoft Excel.

Some example use cases:

• After interacting with an external system, you need to simplify or re-write the XML files that you received.
• You need to combine information from different sources into 1 file, but also reformat it (this is more than what the **Join XML** task can do). For example getting job specification from an incoming XML file and getting ink information from the metadata of an uploaded PDF (XMP). You want to combine those into one XML that can be used for the **Job Creation** task. To do this, the XMP ink information should also be transformed to the XML format that is needed for **Job Creation** task.

• You need to transform an XML that you received before it can be used by the **Create CAD Sheet** task.

• You receive an XML file with all possible sheet layouts. Now you need to create a list of these layouts using a custom text format (for example plain text with line breaks, CSV or XML).

Tip: The chapter *Examples* on page 96 contains many examples that use this task.

5.4.2. Main Tools in the Task Panel
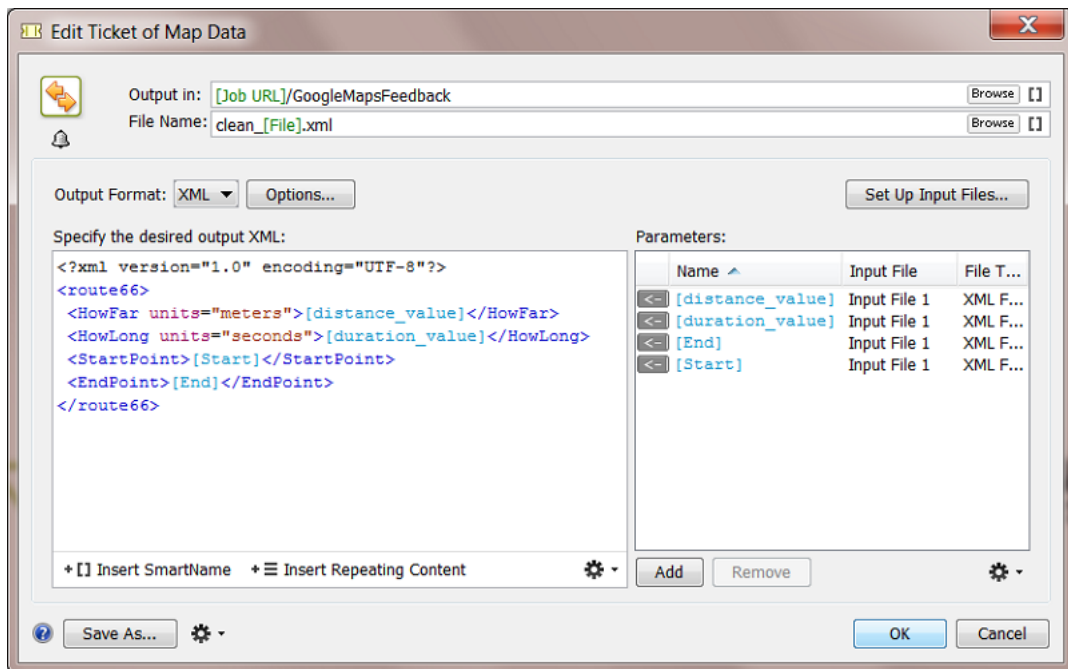
The **Map Data task** panel consists of three main parts:

1. Option to choose the Output Format.
2. Canvas to specify the content of the output file of this task.
3. List of Parameters that you want to read from the task's input files.

Choose the Output Format

- **XML**: Click on **Options** to define these output format options:

  - **Replace reserved characters in parameter values with XML entities**: It is possible that the parameters from the input files return characters that are not allowed in XML. With this option, you choose to map these special characters to 'XML entities'. Below list shows these mappings:

Reserved characters in result value	Meaning	XML Entities
"	quotation mark	"
'	apostrophe	'
&	ampersand	&
>	greater than	>
<	smaller than	<

  - **Task fails when output XML is not a valid XML file**: Enable this option to have Automation Engine check the validity of the XML. If this option is on, the task will fail if the XML is not valid. The validation checks the XML formatting and the XML tag endings.

    Note: This task does not check XML schemas such as XSD, DTD, etc.

- **CSV**: Click on **Options** to define this Output Format option:

- **Text Encoding**: Choose what type of text encoding that the system that will read this CSV file prefers. The default is UTF-8.

Canvas to Specify the Content of the Output file

The canvas on the left there is where you can

- insert XML or CSV data from another file. This is the typical way to insert your example output file, after which you can start replacing its absolute values with SmartNames or Parameters.
- insert Parameters from your input files (from the list on the right side of the panel)
- insert SmartNames
- insert Xpath expressions (the standard language to extract specific parts of an XML)
- ...

See more in *Specifying the Output File* on page 59.

Tip: Right-click in the canvas to get a list of content to insert.

A List of Parameters from your Input Files

In this field, you build up a list of parameters from your input files. You can then insert these parameters easily in the canvas on the left, similar to how you insert SmartNames. These parameters can come from one or more input files.

At the moment you set up the Map Data task, it is good practice to use *example* input files that contain the same parameters as the files that will be the *real* input files of the Map Data task once it is started in a workflow. It is also a good idea to start from a sample output file (see further).

See more in *Setting Up (Example) Input Files* on page 54 and *Adding Parameters* on page 57.

5.4.3. Main Workflow in Using the Map Data Task

Before we go in more detail explaining all the possibilities of this powerful task, it is good practice to stick to following main workflow:

- Step 1: Get an example of the output file you need to create. Analyse its structure.
- Step 2: Get (an) example input file(s). Analyse its structure.
- Step 3: Create the parameters from the input file(s).
- Step 4: Specify the output file. Use your example output file and the parameters that you made from the input file(s).
- Step 5: Test the resulting ticket in a workflow, using real input files.

5.4.4. Setting Up (Example) Input Files

Attention: An example input file is a file that you use while you set up the **Map Data** ticket. Be aware that this example file is often not your real input file once the task is running!

> **Important:** The **Map Data** task allows to create parameters *without* the help of example input files but this will be much more complex. We advise to create the parameters based on example input files because it will help you with correct spelling, see the larger context and give you immediate feedback.

2 ways to select an Input File

- In the **Pilot**, select one or more input files **before** you open the **Map Data** ticket. These files will show up as input files.

- Open the **Map Data** ticket and click on **Set Up Input Files...**.

Setting up an **Input File** is explained in more detail in the next sections of this document.

Working with Multiple Task Input files

By default a **Map Data** task will start as soon as it gets one input file. The task will not wait for a list of input files to be complete. But you can easily solve that.

To make the **Map Data** task work on multiple input files, you need to make a workflow where you have a **Data Collector** task before your **Map Data** task.

The **Data Collector** task will wait for outputs of previous tasks and hand them over as one group to the next task.

How to Control the Order of Multiple Input Files

If your **Map Data** task has more than one input file, it is very important to control the order of those input files. What you want to avoid is

- parameters that do not find their value because they look in the wrong input file.
- parameters that find a value but one that comes from the wrong input file.

Some examples that illustrate the importance of parameters looking in the correct input file:

- Your **Map Data** ticket is part of a workflow that creates a new **Job**. Does the parameter [date] or [time] come from the input file from the MIS or from the metadata-XML from the PDF that the customer sent you? The difference can result in a conflict about your due date of that **Job**!

- Your parameter [print technique] selects the field in row 2, column 5 of a CSV file. If this parameter searches this field in the wrong input file, then your search can return "Rio de Janeiro" instead of "Digital Flexo"!

To control the order of your input files, we advise to first use the **Data Collector** task, followed by a **Sort** task and only then followed by the **Map Data** task.

The **Data Collector** task will wait for outputs of previous tasks and hand them over as one group to the next task.

The **Sort** task enables you to sort that group. You can base the order on file name, time or SmartNames.

Setting up (Example) Input Files – Details

1. Click on the **Set up Input Files...**.

   A panel opens that shows your current list of Input Files, their name and order in the list, their type (XML or CSV) and if they link to an example file or not.

2. To add or modify one, click on **Add** or double click an existing Input file definition.

   The **Set Up** panel opens.
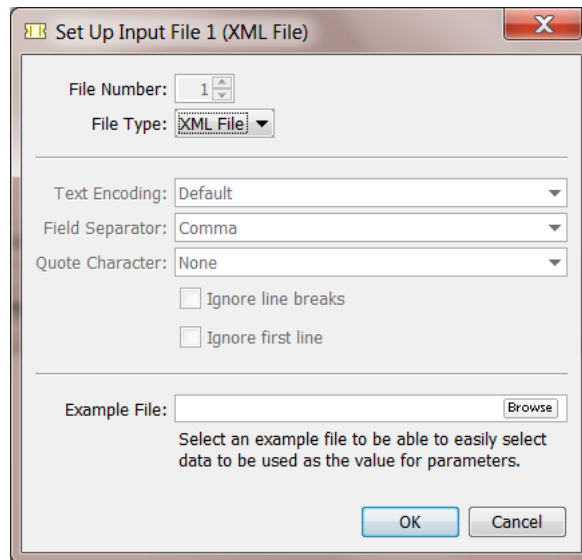
3. Choose the **File Type** of the desired Input File: **XML File** or **CSV File**.

4. In case you chose **CSV File**, you can change the following CSV options:

   - **Text Encoding**: Indicate the **Text Encoding** of the CSV file. The default encoding is Unicode UTF-8.

   - **Field Separator**: Indicate which character is used to separate the fields in the CSV. Check your CSV in a simple text editor to detect it.

   - **Quote Character**: Indicate if the value in the CSV contains quotes that you do not want to keep. For example: In the CSV the value is written as `"25000"` but you want to extract only the `25000`.

   - **Ignore line breaks**: Check this option if the CSV only contains one record (column).

   - **Ignore first line**: Check this option if the first line of the CSV contains the names of the columns.

     Note: These CSV options have a great impact on the way the CSV input files are handled. A selected value field (using the field number and the line number of the field) can be the wrong one if the CSV options are not set correctly.

5. If you want, select an example file to be able to easily select data to be used as the value for parameters.

Removing an Input file

In the **Set Up Input files** panel, the **Remove** button will remove the selected input file.

When there are no parameters created yet that use that input file, the input file item will be removed. You will not be asked to confirm.

But when the input file is in use, you will see a warning mentioning this use. You will be asked to confirm before deleting the input file item together with all the parameters or 'repeating content' that require that input file.

> **Note:** A similar warning and effect happens when you change the *File Type* of the Input file (from XML to CSV or vice versa).

5.4.5. Adding Parameters

There are basically 3 ways to create new parameters:

- creating them one by one, using the **Add** button.

- loading **multiple** parameters from a file, using the ⚙ ▾ button.

- duplicating an existing parameter, using the ⚙ ▾ button.

Adding Parameters

Once you specified the output format and set up the (example) input files, you can start adding parameters that represent the values that you wish to insert from the task's input files into the output file.

To add parameters, proceed as follows:

1. Click **Add** underneath the **Parameters** list.
The **Add Parameter** dialog prompts.

2. Enter a **Name** for the new parameter.

3. Select the **Input File** that contains the value for the parameter.

4. Specify where the value for the parameter is located in the selected **Input File**:

- In case you selected an XML **Input File**, specify the **XPath Expression** of the value in the input file to be used as the value for the parameter. If you selected an example XML file for the XML input file, you can easily create the **XPath Expression** using the **Edit** button. This will open the **XPath Builder**. For more information on **XPath Builder**, see *The XPath Builder* (chapter 'SmartNames').
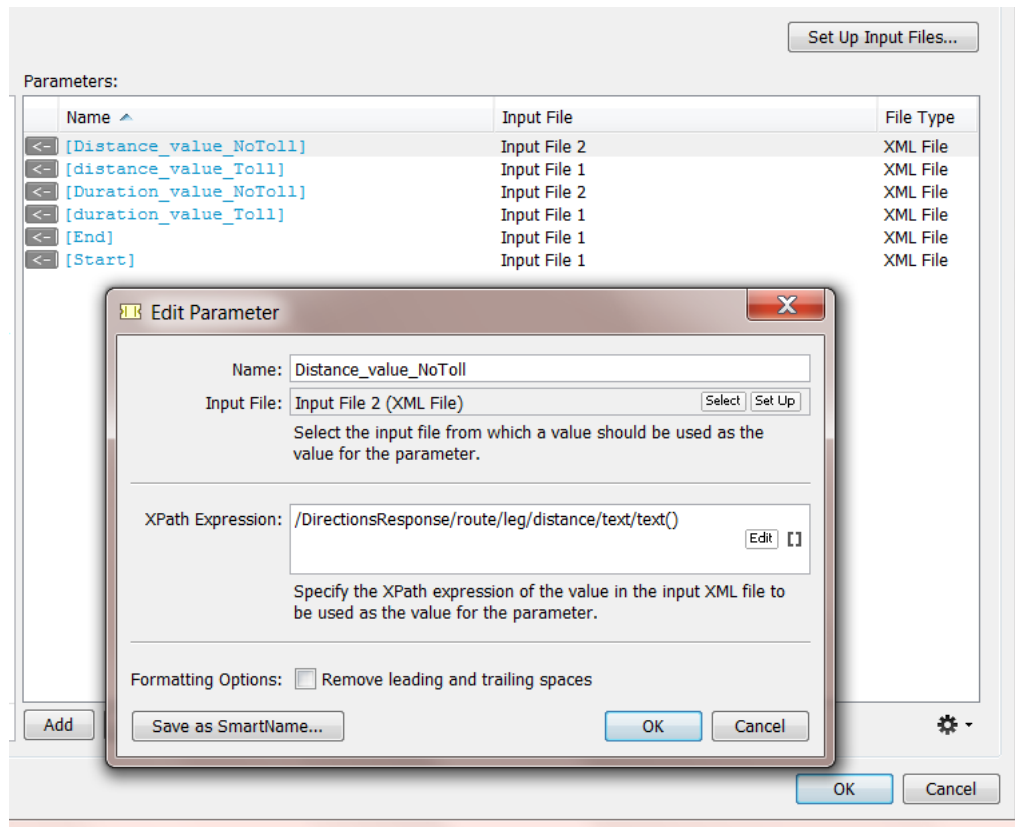
> ⚠️ **Attention:** When the expression asks for the text node that contains no text (an 'empty node'), the task will fail ("`ParseErrorException`").

- In case you selected a CSV **Input File**, specify the **Field** number and the **Line** number of the field in the input CSV file to be used as the value for the parameter. If you selected an example CSV file for the CSV input file, you can select the desired field using the **Select Field** button.

5. **Separator**. If the XPath expression returns multiple elements, decide what character you want to be used as separator.

6. **Formatting Options**. If you suspect that the chosen value might have leading and/or trailing spaces, select **Remove leading and trailing spaces**.

7. If you want to save the created parameter as a SmartName, then click **Save as SmartName…**. In the prompted dialog, enter a comprehensive **Name** and **Description** and choose whether or not you want this SmartName to be **Private**.

8. Click **OK** to add the parameter to the **Parameters** list.

The created Parameter is now in the **Parameters** list. You can now insert the created parameter in the output XML or CSV (see).

Note:

- To edit an existing parameter, select it in the **Parameter** list and double-click it.

- To delete an existing parameter, select the parameter and click **Remove**. You will get a warning when you try to delete a parameter that is in use (in the canvas on the left).

- To delete all unused parameters, click on the action button ⚙ ▾ underneath the **Parameters** list and choose **Delete Unused Parameters**. You will be asked to confirm.

- To add Parameters from an example input file, see the next section.

Loading Multiple Parameters from a File

Instead of creating parameters one by one, you can choose to load multiple parameters from a file. Those that you would not need are easy to remove from the list anyway. To do so, proceed as follows:

1. Underneath the **Parameters** list, click on the **Action** ⚙ ▾ button.

2. Choose **Load Parameters from File** in the prompted menu.

   The **Load Parameters from File** dialog will prompt.

3. **Select** the desired **Input File** from which you want to load the parameters.

4. If the selected **Input File** is an XML file, proceed as follows:

   a) Specify the **XPath Expression** to load the XML parameters from the **Input File**. You can click **Edit** to open the Xpath Builder to help you build the desired **XPath Expression**. .

   b) Click **OK**.

      All parameters from the selected XML Element will be loaded, including child elements and all attributes

5. If the selected **Input File** is a CSV file, proceed as follows:

   a) If the **First line contains parameter names**, select the similarly named option and the values from the first line will also become parameters.

   b) Click **OK**

      CSV Parameters will now be added for every field of every record in the **Input File**.

Note: About names of parameters:

- When one or more parameters that are loaded from the example input file have the same name (because the XML element name, the XML attribute name or the CSV field name in the example XML/CSV file is the same), their names will be made unique by auto-numbering them.
- When one or more parameters with the same name already exist, a warning dialog will pop up asking you if you want to replace them or not. If you choose to replace them, this will overwrite their current contents.

5.4.6. Specifying the Output File

The canvas on the left of a **Map Data** ticket is where you define what your resulting XML or CSV output file will contain.

There are many types of smart content that you can add to this canvas. And you can even type in some content yourself. Some of these types of content are listed via the ⚙ button. You will also see a complete list of possibilities when you right-click inside the canvas.

Note: Most of these are sensitive to the position of your cursor at the moment you right-clicked. They will not be offered when they are not valid at that specific insertion point.

⚠ **Caution:** There is no 'Undo' function while editing in this canvas.

Tip: Find a good *example* in the chapter *Examples* on page 96. It shows how 2 XMLs from the application Google Maps are mapped into one smaller output XML. That output XML so contains only specific content to be picked up as workflow parameters.

Here are all the methods and data types that you can enter:

Cut-Copy-Paste
These standard functions work on all types of data you have entered here.

Clear Contents
This will clear the whole canvas.

Insert SmartName
Your output XML can also contain SmartNames. This way you can add information to the XML that was maybe not present in the input files but important extra data for the system that will read the output file.

Note: You can also use the dedicated ⁺[] button.

Paste from File...
The complete content of the selected file will be added here. This will be possible with all content that is in a format that can be output to XML or CSV.

Important: Use this function to paste your example output file.

Insert XML Declaration
It is a good practice to have an 'XML declaration' at the start of your XML file. This line indicates the file encoding to the reading application. This feature will here insert the industry default one:

```
<?xml version="1.0" encoding="UTF-8"?>
```

Insert XML Element
Type in the name of the **element** that you want to insert. An opening and closing statement of that **element** will be inserted. For example:

```
<Distance></Distance>
```

Often, you will continue by inserting a **Parameter** in between those two.

Insert XML Attribute

Type in the name and value of the **attribute** that you want to insert. For example:

```
units="miles"
```

For example: see how this **attribute** was inserted in the above **element**:

```
<Distance units="miles"></Distance>
```

Insert Parameter

Choose the parameter from the list. Alternatively, select the parameter in the parameter list on the right side and

- Click the `<—` to insert that parameter at the current cursor position in the canvas.

- Drag & drop the `<—` to the right position in the canvas.

For example: the parameter [GoogleMapsDist] was is inserted in above example:

```
<Distance units="miles">[GoogleMapsDist]</Distance>
```

Insert New Parameter

This is a shortcut that combines the adding of a new parameter with its immediate placement in the canvas. After you inserted this new one, it will also appear in the parameter list on the right.

Avoiding Problems with some 'Velocity' Characters

> **Attention:** The underlying technology of the Map Data task is *Apache Velocity*. This task allows to build and execute so called 'Velocity templates'. This enables a very powerful tool, but also imposes some limitations.
>
> Some characters in Velocity have a special meaning. For example `$` points to a 'variable', `#` to a 'directive'.
>
> The task can handle such characters when they are entered via Map Data 'Parameters'. But if those characters appear in the fixed text of the template or in the resolved SmartName values, then the task may fail unexpectedly.
>
> For example: The following desired output would make the task fail:
>
> *
>   ```
>   <job>
>   <separation value="ink#1">
>   </job>
>   ```
>
> * Or, in case a SmartName is used (where `inkname` would result in `ink#1`):
>
>   ```
>   <job>
>   <separation value="<<inkname/>>">
>   </job>
>   ```
>
> To avoid this problem, you need to add `#[[` at the beginning and `]]#` at the end of the string that contains those special characters.
>
> For example:
>
> *
>   ```
>   <job>
>   <separation value="ink#[[#]]#1">
>   </job>
>   ```
>
> * Or, in case of SmartNames:
>
>   ```
>   <job>
>   <separation value="#[[<<inkname/>>]]#">
>   </job>
>   ```

Important: Esko's support and documentation on Velocity templates is limited to what is described in this manual.

5.4.7. Inserting Repeating Content

Your output XML can include a block of repeating content that represents a repeating XML element in your XML input file. For example: for each book described in the input file, you want to pick up selected parameters like its author, category and price (see this example in below screen shots).

Creating a Repeating Content Block

Make sure your cursor is at the correct place in the canvas and then right-click or use the dedicated ✢☰ button. In the dialog, type the XPath expression that selects the repeating XML element in your selected **Input File** or click **Edit** to use the Xpath Builder.
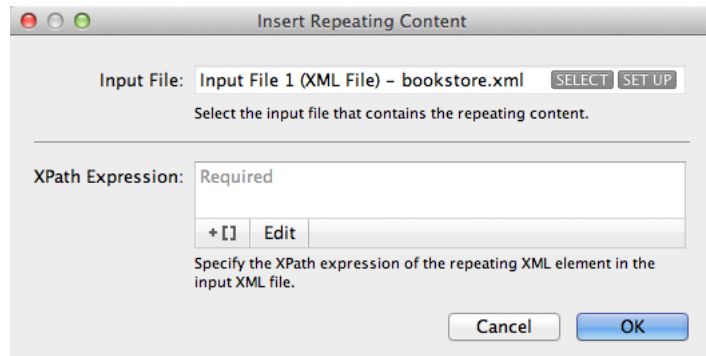
Click **OK** and see the repeating content block appear in pink. If you want, you can now manually add XML elements:
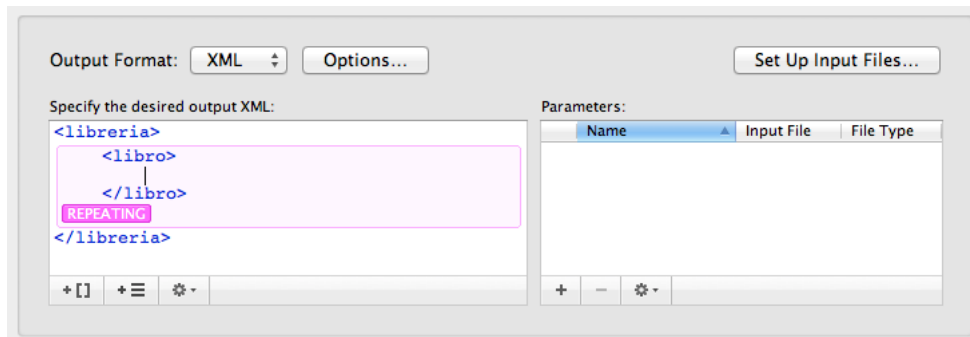

Loading Parameters into a Repeating Content Block

You can now add parameters in the way we described *above*. However, we here describe an optimized way that will avoid loading too many parameters that you may not need.

1. Place your cursor inside the repeating content block and select **Load Parameters from File...** from the ⚙▾ button under the list of **Parameters**.
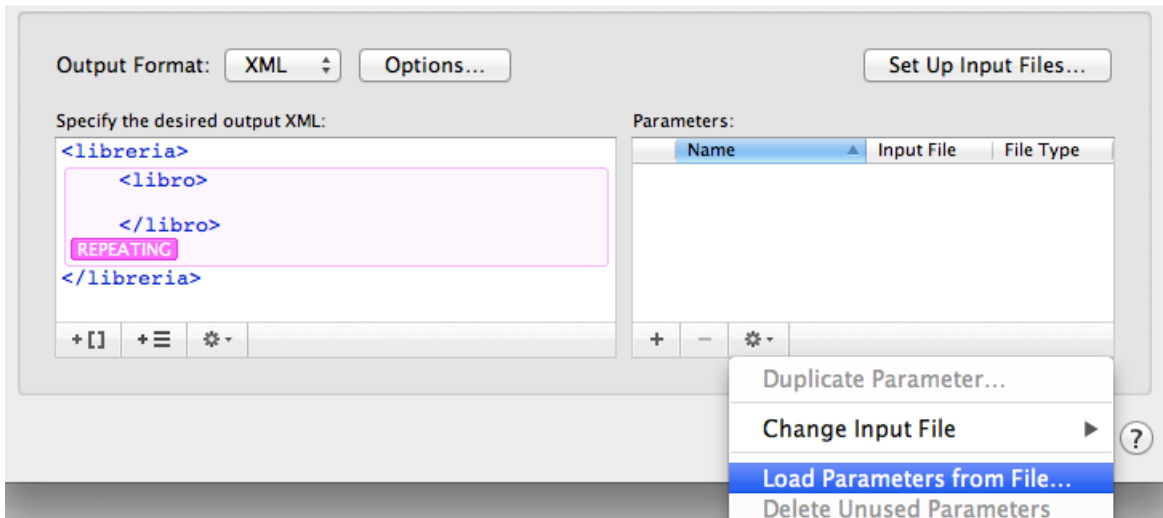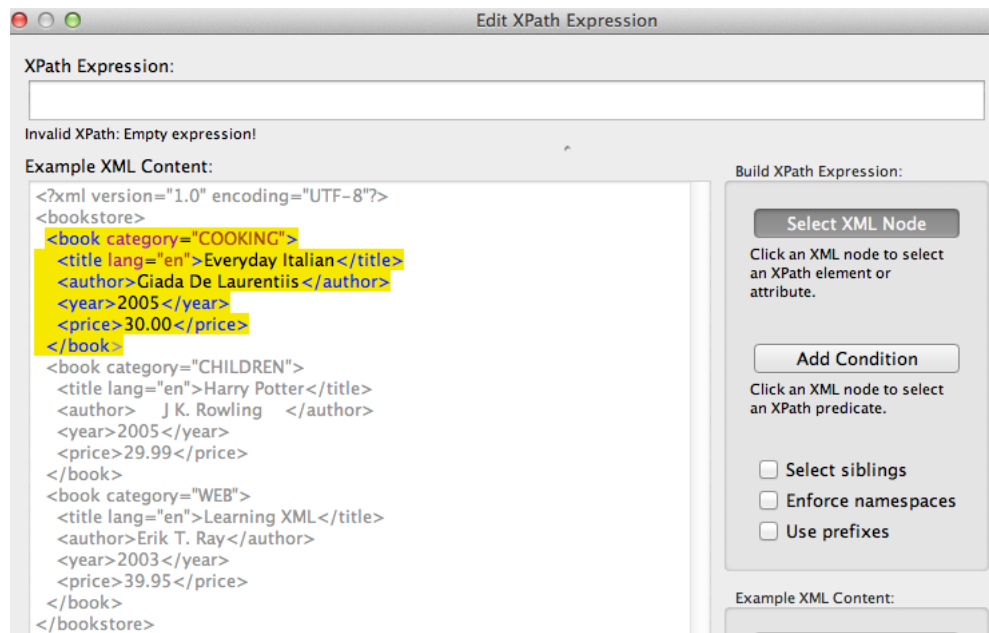
2. In the **Load Parameters from File** dialog, you have a choice:
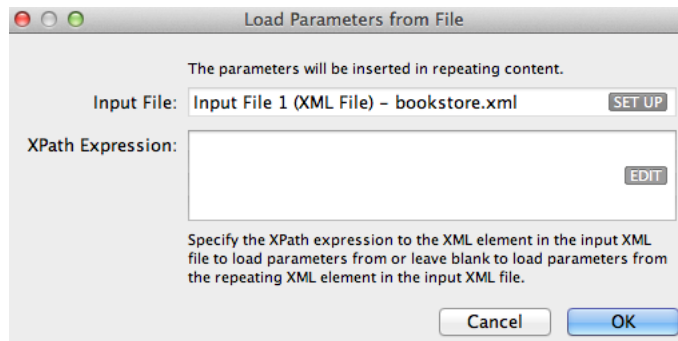
a. You can specify an **XPath Expression** to an XML element inside the repeating XML element in the **Input File**. To do this, click **Edit** to open the Xpath Builder and there select the XML element.

b. Or you can choose to load all parameters from that repeating XML element. To do this, leave the **XPath Expression** field blank.

3. Click **OK** in the **Load Parameters from File** dialog. This will add **Parameters** for every child XML element of the selected XML element and for all of their XML attributes. Their pink color indicates they can (only) be used for repeating content:
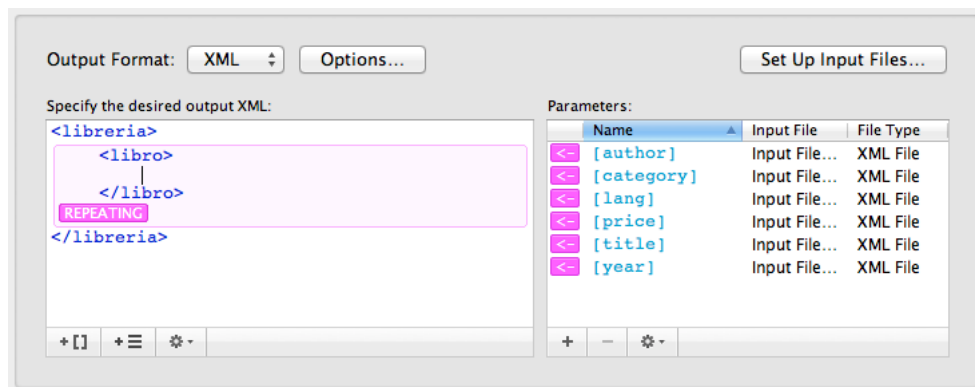
4. Now build your repeating content block by positioning your cursor in between an XML element and clicking the pink arrow of a parameter. An example:
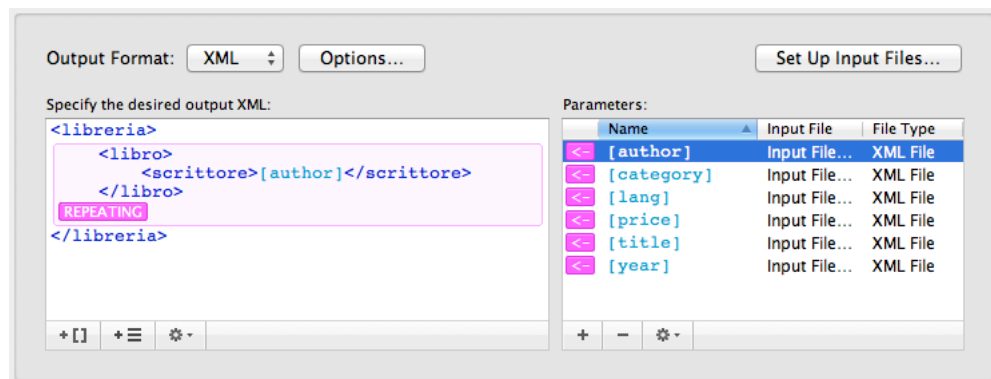
Nested Repeating Content

It is also possible to insert repeating content inside another repeating content block. See this example:
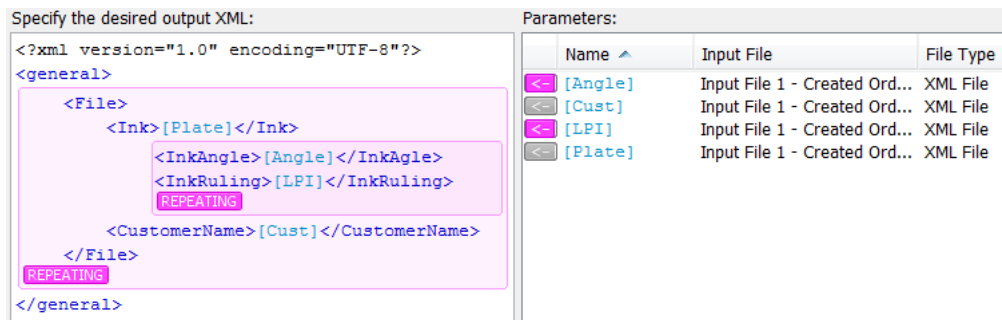
5.5. Join XML Files task

5.5.1. Concept

The **Join XML** task joins the content of its input XML files. In case you do not want the full content of all these input files, there are options to determine what parts you want or from what root level down that you want their content.

Some typical examples:

- The information you need is spread over several source XML files, maybe even coming from different systems. You need (parts of) them combined in 1 XML file.
- You want to change the content of an XML. After splitting it you can re-join specific parts.

Note: The **Map Data** task can also be used to *join* XML files, but it offers much more features and options than this **Join XML** task.

5.5.2. Example and Options

The **Join XML task** joins multiple input XML files into 1 output XML file. The default option of this task is to take the full content of the input files and join everything together into 1 XML file.
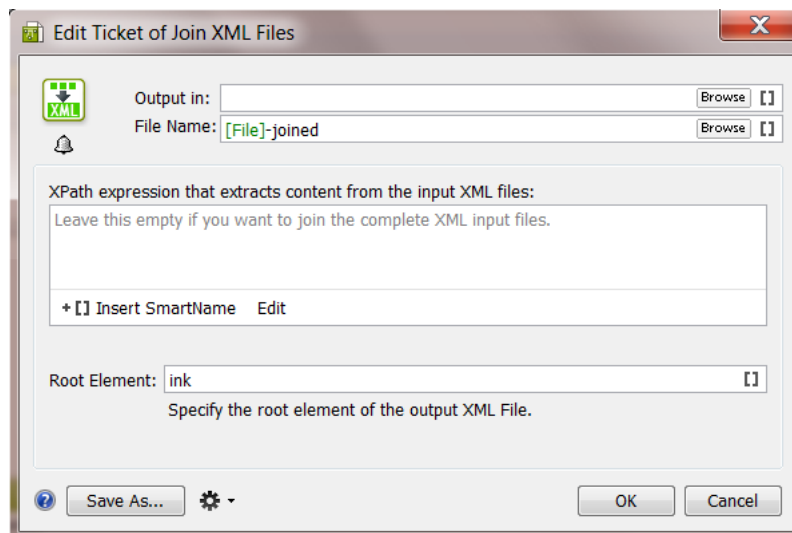
Name of the output XML file

The default name of the output XML file is set to **[File]-joined**. **[File]** is here the name of the first input file. You can of course change this setting.

Xpath expression that extracts content from the input XML files

Tip: In the previous topic about the **Split XML** task, we introduced **Xpath expressions** and also introduced the **XPath Builder** tool.

This canvas is where you can define the content of the output XML. If you do not want the full content of all your input files, use XPath expressions to define what you want to extract from them. Per input file, all nodes that comply with the given XPath expression are imported into the output XML file.

Click on ⁺ [] to insert **SmartNames** to help build your XPath expression.

Click on [Edit] to open the **XPath Builder**. For more info on **XPath Builder** please see *The XPath Builder* (chapter 'SmartNames').

If this canvas is left empty, and if you didn't specify a **Root Element**, then all the nodes under the root node are considered (XPath == /*/*).

Root Element in your output file

Each input XML file has its own **root element**. You can define here what you want as **root element** in the output XML file. See an example where this root element was set to 'ink':

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <ink>
      <name>BananaYellow</name>
      <type>Designer</type>
      <book>FruitColors</book>
  </ink>
```

If this field is left empty, then the tag name of the root of the first input file will be used.

Example

You have these 2 XML files:

• One XML file lists ink attributes of a (first) ink of a PDF:

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <job>
      <name>banana.pdf</name>
    - <ink>
          <name>803</name>
          <type>pantone</type>
          <book>pms1000c</book>
          <angle>7</angle>
          <ruling>92</ruling>
          <dotshape>round</dotshape>
      </ink>
  </job>
```

• Another XML file contains information on the ink coverage of that file:

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <job>
      <name>banana.pdf</name>
      <customer>FruitCo</customer>
    - <ink>
        - <inkcov>
              <pct>27.12</pct>
              <mm2>6512</mm2>
          </inkcov>
      </ink>
  </job>
```

You now want to join these 2 files into 1 XML file with **all** the ink attributes together.

• This is the result if you use **no options**:

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <job>
      <name>banana.pdf</name>
  - <ink>
        <name>803</name>
        <type>pantone</type>
        <book>pms1000c</book>
        <angle>7</angle>
        <ruling>92</ruling>
        <dotshape>round</dotshape>
    </ink>
      <name>banana.pdf</name>
      <customer>FruitCo</customer>
  - <ink>
      - <inkcov>
            <pct>27.12</pct>
            <mm2>6512</mm2>
        </inkcov>
    </ink>
  </job>
```

- This is the result when you set the option **Root Element** to **PrintItem**:

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <PrintItem>
      <name>banana.pdf</name>
  - <ink>
        <name>803</name>
        <type>pantone</type>
        <book>pms1000c</book>
        <angle>7</angle>
        <ruling>92</ruling>
        <dotshape>round</dotshape>
    </ink>
      <name>banana.pdf</name>
      <customer>FruitCo</customer>
  - <ink>
      - <inkcov>
            <pct>27.12</pct>
            <mm2>6512</mm2>
        </inkcov>
    </ink>
  </PrintItem>
```

- This is the result when you **also** used the **Edit** button to add the **XPath Expression /Job/ink**

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <PrintItem>
  - <ink>
        <name>803</name>
        <type>pantone</type>
        <book>pms1000c</book>
        <angle>7</angle>
        <ruling>92</ruling>
        <dotshape>round</dotshape>
    </ink>
  - <ink>
      - <inkcov>
            <pct>27.12</pct>
            <mm2>6512</mm2>
        </inkcov>
    </ink>
  </PrintItem>
```

Because the Xpath extracted only the content of <ink>, the pdf file name and the customer name are not kept in this joined file.

Note: To further change the structure, order or content, you can use the **Map Data** task.

5.6. Split XML File task

5.6.1. Concept

Sometimes you want to split XML files to make them more easy to use Automation Engine workflows. These XML files typically come from an external system. The **Split XML task** needs 1 XML file as input and will write 1 or more XML files as output. Some typical examples:

- Every morning your MIS system sends you a list with new Jobs and their details. To use that XML for the **Create Job task**, you need to split it into 1 XML per Job.

- Your MIS system sends an XML per customer order, but your workflows are set up per production item of an order. In this case, the **Split XML task** helps you to generate an XML file per production item. This makes it easier to automate your workflow. This example is elaborated below.

Tip: You can also use this task to split an XML that was created by Automation Engine itself. For example to make that XML more manageable for an external system.

Supported input files
The input of this task is XML. Files with a different extension than **.xml** will not be recognised or processed.

Note: Exception: JDF files are also allowed as input. The resulting output will be XML files. These XML files will no longer be valid as JDF file.

How do you decide what to split?
How you split the task's input file is defined by XPath expressions (built of static text and SmartNames). The task splits each matching element into separate XML files.

The built-in **XPath Builder** will help you to write those expressions. See further.

5.6.2. Example and Options

General Behavior

- **Encoding**
  - When the input XML file contains a header that specifies an encoding (for example `encoding="ISO-8859-3"`), the task will write the output files in that encoding.

  - When no header or encoding is specified, the resulting files will have **UTF-8** encoding by default.

- **XML Validation**

The task will generate well formed XML, but there is no support for schema or DTD validation. References to DTD's for validation will be removed.

Example

The following code is grouping 2 production items in 1 XML file:

```
<?xml version="1.0"?>
<job>
  <commoncomponent>Z</commoncomponent>
  <commoncomponent content="Y" />
  <productionitem>
    <subelement content="A" />
    <subelement>1</subelement>
  </productionitem>
  <productionitem>
    <subelement content="B" />
    <subelement>2</subelement>
  </productionitem>
</job>
```

To split each production item into a separate XML file, type this expression in the XPath input field:

```
/job/productionitem
```
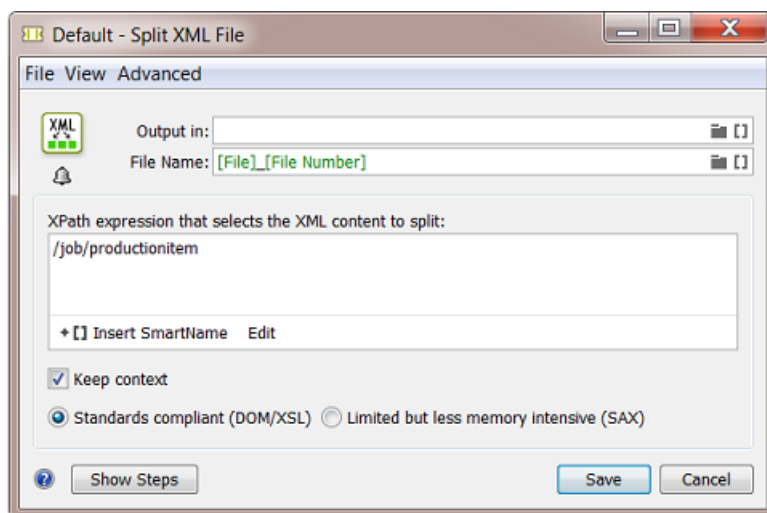
This will split the file into these 2 files:

```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<job>
  <commoncomponent>Z</commoncomponent>
  <commoncomponent content="Y" />
  <productionitem>
    <subelement content="A" />
    <subelement>1</subelement>
  </productionitem>
</job>
```

```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<job>
  <commoncomponent>Z</commoncomponent>
  <commoncomponent content="Y" />
```

```
    <productionitem>
      <subelement content="B" />
      <subelement>2</subelement>
    </productionitem>
 </job>
```

Note: The SmartName **[File Number]** is available for this task only. It is added by default to automatically generate unique names for the output files.

Options

- **Keep context** :

  - When **selected**, the XML content that is not selected by the expression will be kept in the output file, of course except the sibling elements of the selected elements (siblings are elements at the same level with the same name).

    By also keeping this extra context info, the result XMLs will look like the input XML, as they will still have the same structure.

    > **Attention:** With this option selected, the next option (the below described setting to decide which parser method is used (DOM or SAX)) can influence which extra contextual parts are kept in the output XML files.

  - When **not selected**, the output file will only contain the parts that your XPath expression selected.

    Using the above example as input, the task will split it into these 2 XML files:

    ```
    <?xml version="1.0" encoding="UTF-8" standalone="no" ?>
    <productionitem>
      <subelement content="A" />
      <subelement>1</subelement>
    </productionitem>
    ```

    ```
    <?xml version="1.0" encoding="UTF-8" standalone="no" ?>
    <productionitem>
      <subelement content="B" />
      <subelement>2</subelement>
    </productionitem>
    ```

  - When an input file contains a '**namespace declaration**' in the parent XML structure ('xmlns'), then that namespace declaration will be added as an attribute of the top level element. For example:

    ```
    <?xml version="1.0" encoding="UTF-8"?>
    <job xmlns:esko="http://www.esko.com/myowns/">
      <commoncomponent>Z</commoncomponent>
      <commoncomponent content="Y" />
      <esko:productionitem>
        <esko:subelement content="A" />
        <esko:subelement>1</esko:subelement>
      </esko:productionitem>
      <esko:productionitem>
        <esko:subelement content="B" />
        <esko:subelement>2</esko:subelement>
      </esko:productionitem>
    </job>
    ```

    With such namespace declaration on the top level element, the split will result in these files:

    ```
    <?xml version="1.0" encoding="UTF-8" standalone="no"?>
    <esko:productionitem xmlns:esko="http://www.esko.com/myowns/">
    ```

```
    <esko:subelement content="A" />
    <esko:subelement>1</esko:subelement>
</esko:productionitem>
```

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<esko:productionitem xmlns:esko="http://www.esko.com/myowns/">
    <esko:subelement content="B" />
    <esko:subelement>2</esko:subelement>
</esko:productionitem>
```

- **Standards Compliant (DOM/XSL) or Limited but less memory intensive (SAX)**:

  The XML file format was not designed to contain huge dumps of information. However, some users want to use such huge XML files as input files for this task. This can cause memory problems. This is why the task also offers a different method in reading the file, one that is optimized to read (parse) huge XML files.

  - **Standards compliant (DOM/XSL)**:

    This method takes the complete file in memory and then starts processing it. Depending on your server, this can become a problem when the size of the XML file is hundreds of megabytes. When, for example, the input XML file is 1 Gb, the AE server will, for this task, need at least 1 Gb of memory during the (long) time it processes this file.

    'DOM' stands for Document Object Model. This is the XPath parser that is fully compliant with all standards.

    Before AE v20, this task always used this DOM method for its XPath processing.

  - **Limited but less memory intensive (SAX)**:

    This method only takes one element at the time in memory. This is advised for huge files that still have a simple structure.

    'SAX' stands for Simple API for XML parsing.

    The Esko implementation of the SAX parser does have these limitations:

    - In combination with the option "Keep context", the context is limited to nodes that are higher in the xml hierarchy.
    - Expressions can only have conditions that apply to a node itself, not to other nodes.
    - Advanced features like the "//" operator, functions and axis are not supported.

    In other words, only constructions like these are supported:

    - /nodename/nodename
    - /nodename[@attribute='value']/nodename[@attribute='value']
    - /*[local-name()='nodename'][namespace-uri()='http://..."]

    Learn more and see several examples in *The DOM or SAX choice affects the result of 'Keep Context'* on page 74 .

5.6.3. Creating XPath Expressions

Usually you will not define the XPath expression by typing it in the task window yourself. Use the **Edit** button to open de **XPath Builder**. This tool will help you create your own correct XPath expression by clicking the variable elements. By selecting parts in the window with **Example XML Content**, you will see the resulting XPath expression automatically appear in the top part of this tool.

Important: When the **Example XML content** window is empty, this means that you forgot to select an XML input file before opening the **Split XML task**.
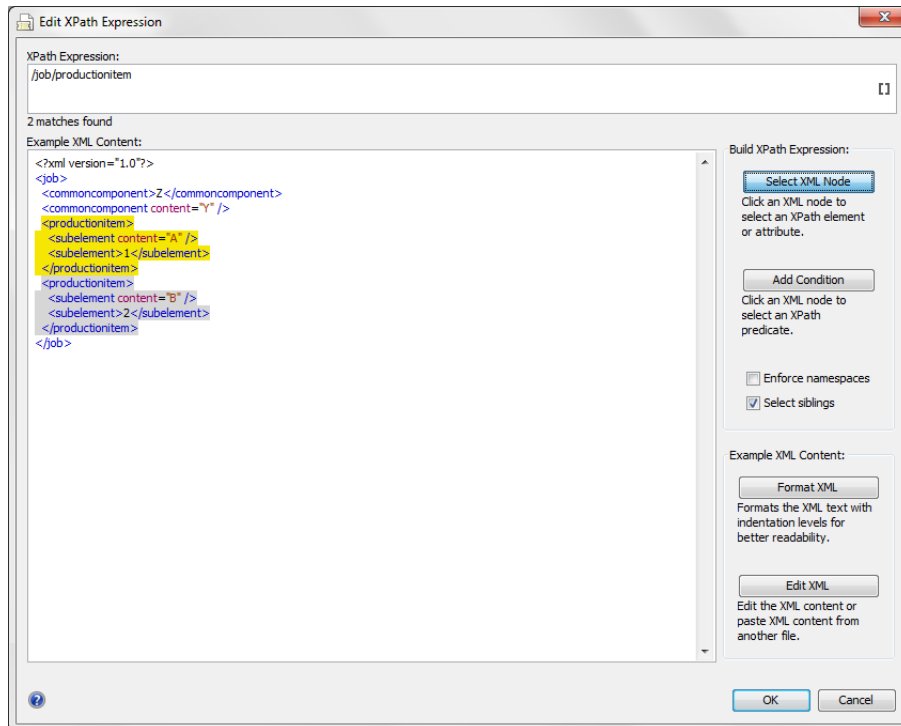
Selecting the option **Select siblings** allows you to automatically select the right level.

In above example, the user selected the level 'productionitem'. The selection is shown in yellow. The siblings are also automatically selected and are shown in grey. The correct **XPath expression** that is needed to split that level of elements will automatically appear in the top part of this tool.

You can easily build complex expressions with this tool, such as:

• selecting elements conditionally.
• selecting an element from a specific 'namespace'.

Find more information on the **XPath Builder** in *The XPath Builder* (chapter SmartNames).

5.6.4. The DOM or SAX choice affects the result of 'Keep Context'

The option to 'Keep context' can lead to different output in 'SAX' versus in 'DOM'. See various examples below.

What if you do not want that result? Your only alternative is to use the other parsing method (DOM / SAX). Both methods have their own specific effects in how they 'Keep context'.

The logic behind these effects is too complex to be described by rules. We can only illustrate them via below examples.

Note: When showing XML files like the below examples, we always use the application Notepad ++. When you open XML files in a browser, you might detect slight differences in how they interpret their grammar. For example An open/close on 1 same line in stead of spread over 2 lines.

Example 1 – Without 'Keep context'

Below example shows how the input file, with that XPath expression, is split into 3 output files, one for each selected node.

The content of the output files is decided by the Xpath expression combined with the other 2 options.

In this simple example, without 'Keep context', the result is the same whether 'DOM' or' SAX' is chosen:
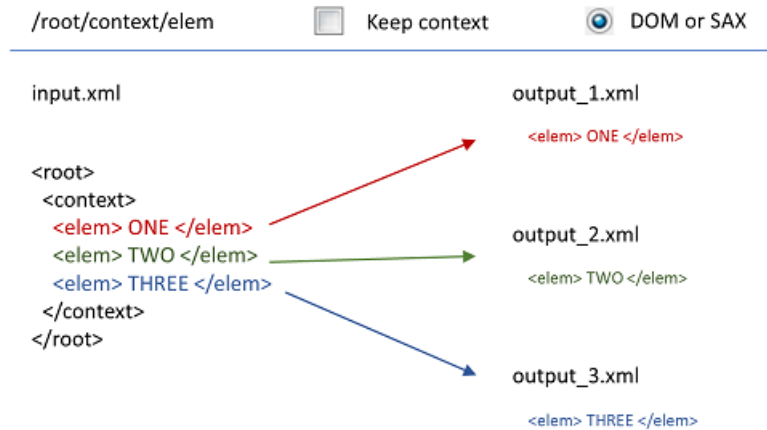
Example 2 – With 'Keep context'

This is the same example as above but now the option 'Keep context' is selected.

The output now also contains other XML content.

With this simple input file and with this xpath expression, the result is the same whether DOM or SAX is chosen:
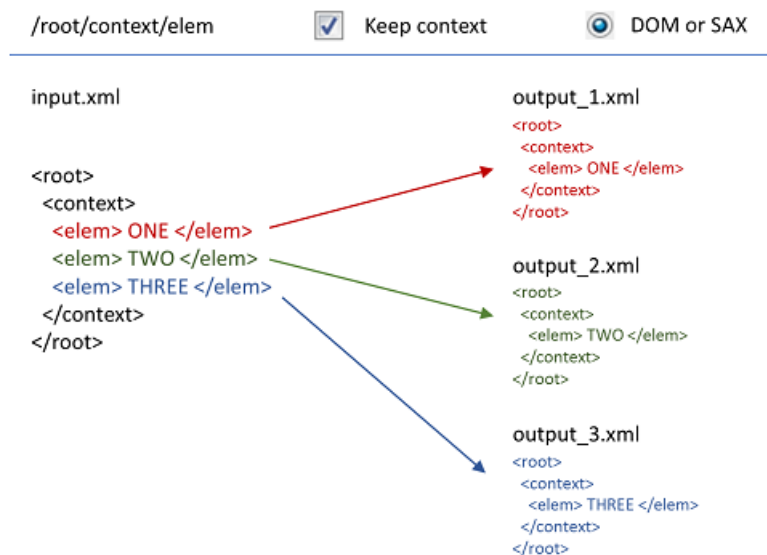
Example 3 – With 'Keep context', SAX

This time the input file and also the XPath expression are slightly different.

This is the output when we use the 'SAX' method:
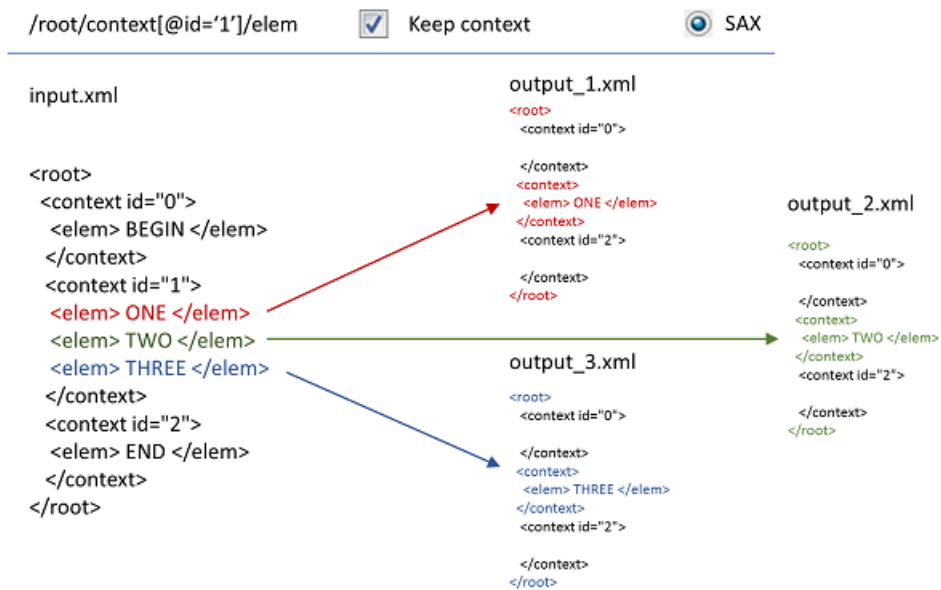
Example 4 – With 'Keep context', DOM

This is the same as the example above but this time we used the 'DOM' method.

Notice the difference in the output:
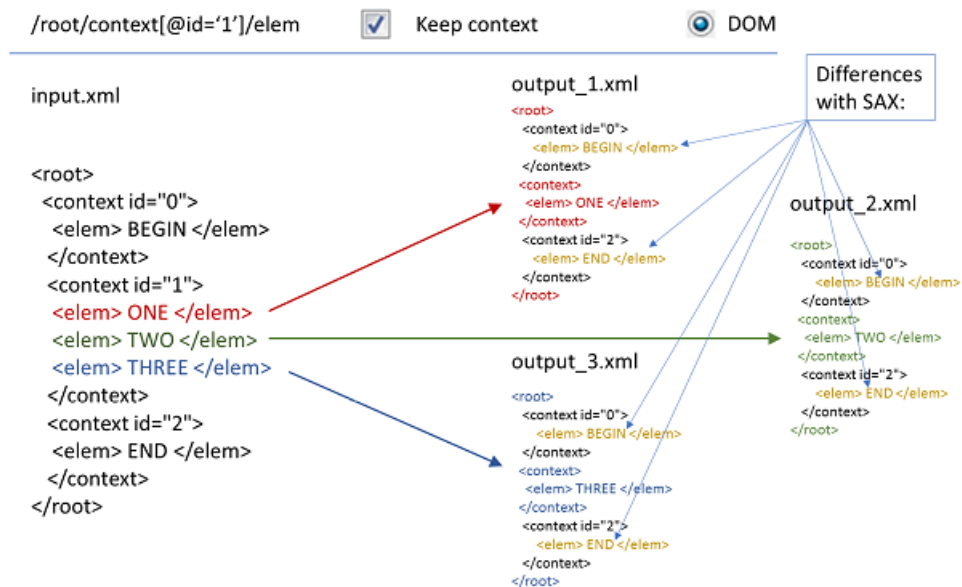
Example 5 – With 'Keep context', SAX

This is the same as example 3 but a level deeper: See the extra `/sub/` in the XPath expression.

This time, also the level of the 'sub' element is kept in the output. But again it stays empty:
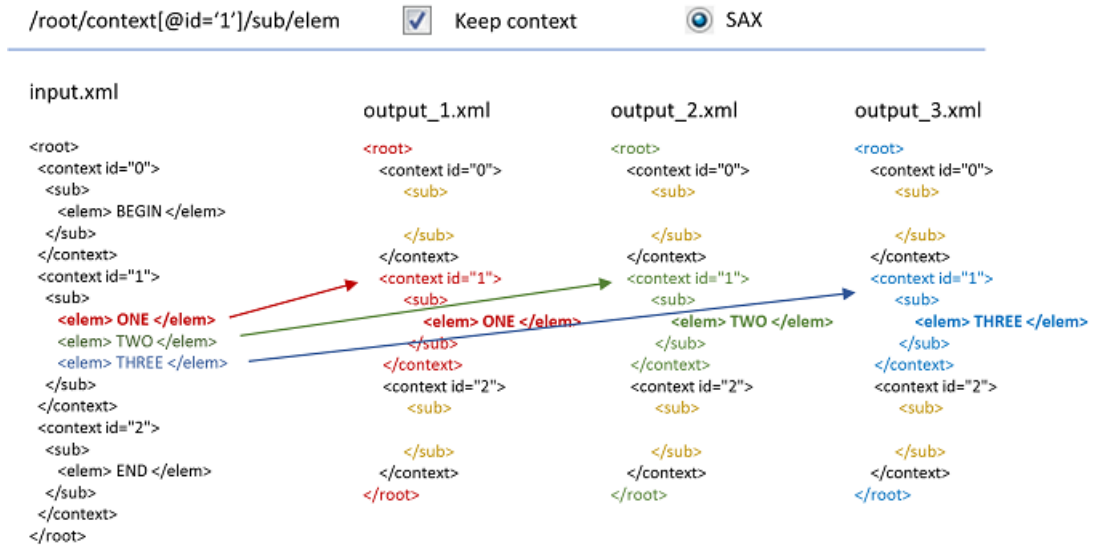
Example 6 – Another example where SAX keeps less XML context than DOM

This time the XPath expression extracts a '`type`':

- Using **SAX** parsing:
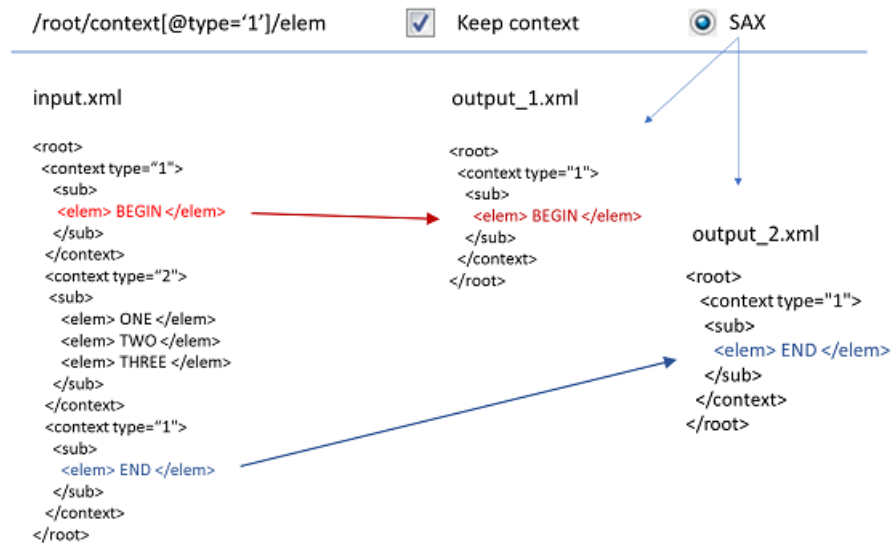
- Using **DOM** parsing.

  Again, the 'DOM' method keeps more context information:
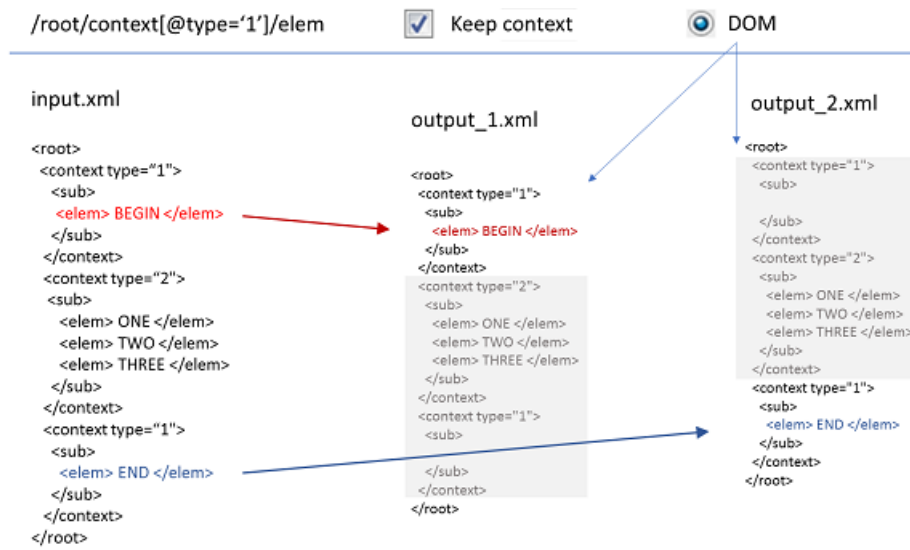
Examples of unsupported Xpath expressions when using 'SAX'

Whether you use 'Keep context ' or not, various types of XPath expressions are not supported when using the 'SAX' method:

- When using 'SAX' , the operator '//' is not supported.
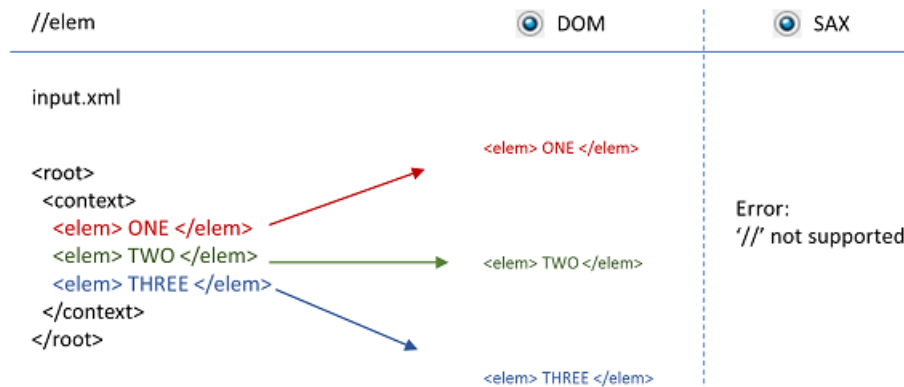
- When using 'SAX', recursive expressions are not supported (expressions on sub-element).

```
/root/context[elem/@id='2']                    ◉ DOM                ◉ SAX

input.xml

 <root>
  <context>
    <elem id='1'> ONE </elem>          <root>                  ERROR:
  </context>                            <context>              condition on
  <context>                              <elem id="2"> TWO </elem>  sub-node not
    <elem id='2'> TWO </elem>          </context>              supported
  </context>                           </root>
  <context>
    <elem id='3'> THREE </elem>
  </context>
 </root>
```
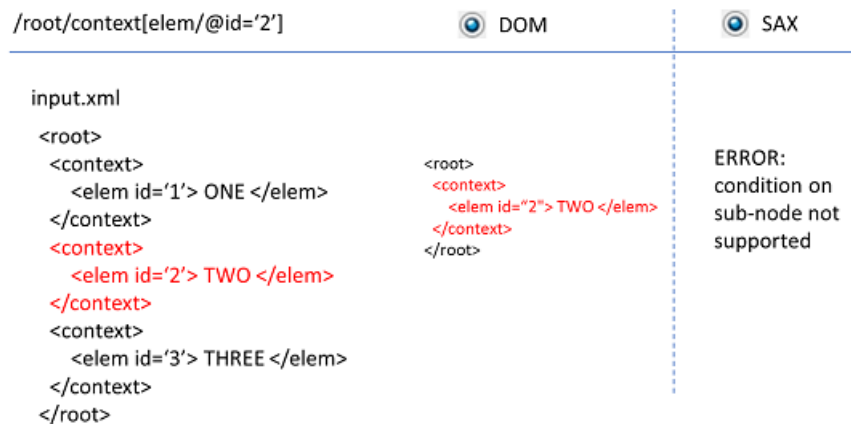
- When using 'SAX', also these expressions will result in an error:

Not supported when using 'SAX'

/root//elem	'//' inside an expression, not just at the start
/root/context/company[substring(@name,0,4)='Esko']	Functions on attributes
/root/context/elem[../@id='1']	Referring to parent nodes
/root/context/sub/elem[text()='ONE']	Selecting on the text of an element
/root/context/sub/elem[string-length(text())=3]	Selecting on the length of a text of an element
/root/context/sub/elem[position()=last()]	Selecting on the position of an element
/root/context[following-sibling::context/@id='1']/sub	Selecting a next element

6. Tasks Interacting with other Systems

> **Note:** Apart from the tasks that we here document, Automation Engine can also offer these tasks that are only available through Esko Solution Services:
>
> • *Interact with SAP task* on page 86
> • *Run ArtiosCAD Standard*
> • *Synchronize ArtiosCAD Boards*
> • *Synchronize ArtiosCAD Companies*
> • *Export ArtiosCAD Design Info*

6.1. Interact using JDF

> ⚠ **Attention:** This task is only available via *Esko Solution Services*.

This task submits a JDF file to a JDF enabled device or system using a `JMF SubmitQueueEntry` command.

The task takes a JDF file as input.

After sending the `JMF SubmitQueueEntry` command, the task remains in a waiting state until the JMF controller sends back a `JMF ReturnQueueEntry` command to Automation Engine. The output of the task is the returned JDF file.

Options:

• **JMF Controller**: This is the HTTP address of the JMF controller.
• **Submit MIME (JMF+JDF)**: If this option is enabled, a MIME package containing the `JMF SubmitQueueEntry` and the input is made and submitted to the JMF controller over HTTP. If this option is not enabled, the JDF is submitted to the JMF controller.
• **Include auxiliary files (PDF...) in MIME package**: If this option is enabled all external files referred to in the JDF with a "`file:`" URL will be included in the MIME package.

6.2. Interact using JMF

> ⚠ **Attention:** This task is only available via *Esko Solution Services*.

This task will submit a JMF to a JDF enabled device or system.

The task takes a JMF as input. The output of the task is the JMF response of the JMF controller to this message.

Options:

• **JMF Controller**: This is the HTTP address of the JMF controller.

6.3. Interact with Database task

6.3.1. Concept

> **Tip:** The tasks that interact directly with external systems were introduced in *Automation Engine tasks Interacting directly with the External System* on page 10. You there also read how this task compares to the **Database Access Point**.

The **Interact with Database** task allows you to communicate directly with an external database. It allows both getting information from that database (read) and sending information to that external database (write).

As mentioned in the chapter *Integration Concepts* on page 9, a typical use for this task is to feed information back to external systems by using this task in a workflow. For example, you can set up this task to update a record in a table of your MIS when your workflow has reached a certain stage. For example setting the status record to 'Proof Ready'.

> ⚠️ **Warning:** This task may not be used to interact with Automation Engine databases. This is not supported by Esko. This can damage your server configuration.

> ⚠️ **Warning:** See the important remark in the task panel. As mentioned earlier in this document, using SQL statements to change records of an external database can potentially harm that database. If you are using this technique then this means that you have a database specialist who takes all liabilities for these SQL queries.

> **Tip:** The chapter *Examples* on page 96 contains 2 examples that contact an external database.

6.3.2. Setup and Options

File Name
When the SQL query is a 'select' statement (see further), the task will dump the found records in an XML file. The default ticket offers the SmartName **[Table Name]** as name for that output XML file. In below screenshot, this name would then be 'ProductionDetails'.

> **Note:** The SmartName **[Table Name]** is only offered in a context where it makes sense.

> ⚠️ **Caution:** Not all SQL queries will resolve a name of a database table. Do not use the SmartName **[Table Name]** when it is possible that no table name is found.
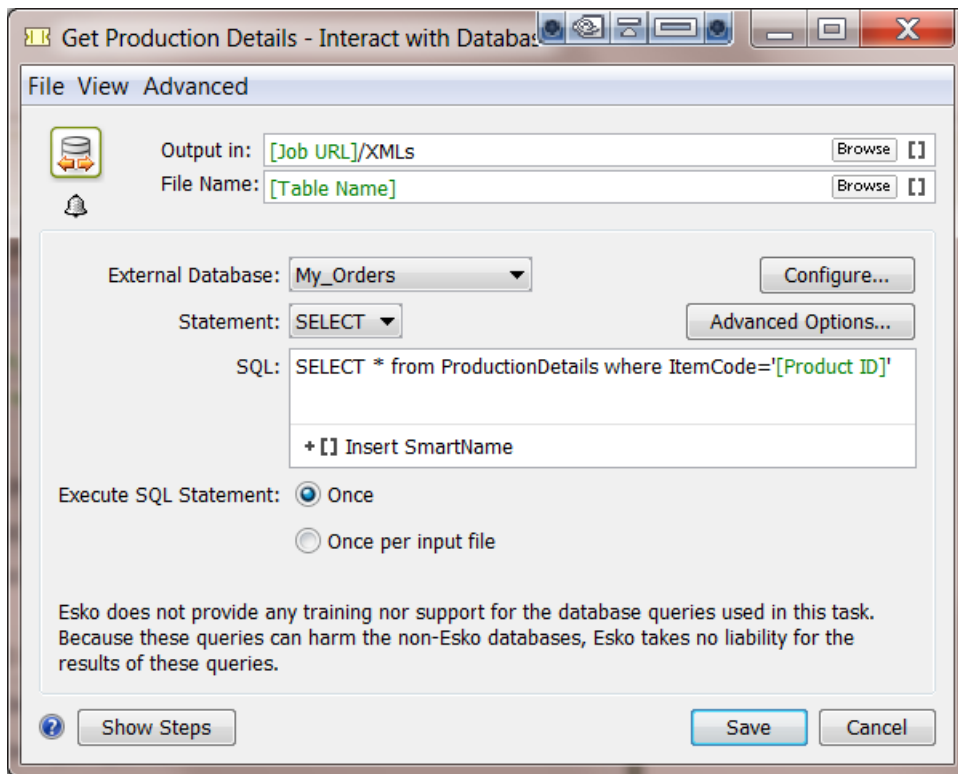
External Database

Select a database from the list of configured databases. Click **Configure...** to access the configure tool directly. Learn more about configuring **External Databases** in the *the related item in the Configure tool*.

Important: Before linking Automation Engine with an external database, please check your license agreements with the database manufacturer.

Statement

Choose the type of SQL statement that you want to use: **SELECT** or **OTHER**.

- **SELECT**

  When using the **Select** statement, the output of the task will be an XML file.

  See an example of such a resulting XML. Notice that the SQL statement is also mentioned inside.

  ```
  <?xml version="1.0" encoding="UTF-8" ?>
  - <rows created="2013-05-23T10:41:32.100+02:00" producer="sqlexec" select="select * from ProductionDetails where Factory='FRANCE' startrec="1">
    - <row>
        <c n="Factory">FRANCE</c>
        <c n="Machine">5802</c>
        <c n="ItemCode">FR-04742</c>
        <c n="Run">March13</c>
        <c n="QC">Passed</c>
        <c isNull="1" n="Comments" />
      </row>
  </rows>
  ```

  Advanced Options...: You can avoid creating an XML file that is too big by limiting the number of records with the option **Maximum number of records per file**. The task will then generate as many files as needed.

- **Other**

In this mode, you can execute any other SQL statement such as INSERT, UPDATE etc. However, the task will in this case not generate an output file.

Note: When the **Statement** type is set to **Other**, you cannot execute a **Select** statement.

In this example the status of the Job is changed in the orders database:

Execute SQL Statement

Decide if you want the SQL statement to be executed **Once** or **Once per input file**.

For example: You have multiple input files for this task: banana.pdf, lemon.pdf and mango.pdf. When your SQL statement uses the SmartName [File] (= the task's input file), then the option **Once per input file** will make the task run **for each input file**. With the option **Once**, the task would only run for the banana.pdf (the first input file).

Tip: Starting a task once and having it run on multiple input files is much lighter for the software than starting the task multiple times with each time only one input file.

6.4. Interact with Web Service task

6.4.1. Concept

Tip: The tasks that interact directly with external systems were introduced in the chapter *Integration Concepts* on page 9.

The **Interact with Web Service** task uses HTTP requests to communicate with a web service of an external system. Both **read** ('GET') and **write** ('POST') commands are possible. The result of this task is typically an XML file.

When an external system is running a web service, you will be able to access it via HTTP (HyperText Transfer Protocol). However, to do this, you also need to learn **what** you can communicate to that system, what language you need to speak to it. Some applications will indeed publish their API (Application Programming Interface). And it is that API documentation that will tell you what you can enter in the **Interact with Web Service** ticket.

Tip: The chapter *Examples* on page 96 contains an example where a web service is contacted.

Difference with a Web Service Access Point.

• A *Web Service Access Point* is a way for an external system to speak to the web service of Automation Engine. This **Interact with Web Service** task is **the reverse**: it is Automation Engine that interacts with the web service of an external system.

• An **Access Point** is used to **start** a workflow. This **Interact with Web Service** task can be inserted at any step of the workflow.

6.4.2. Setup and Options
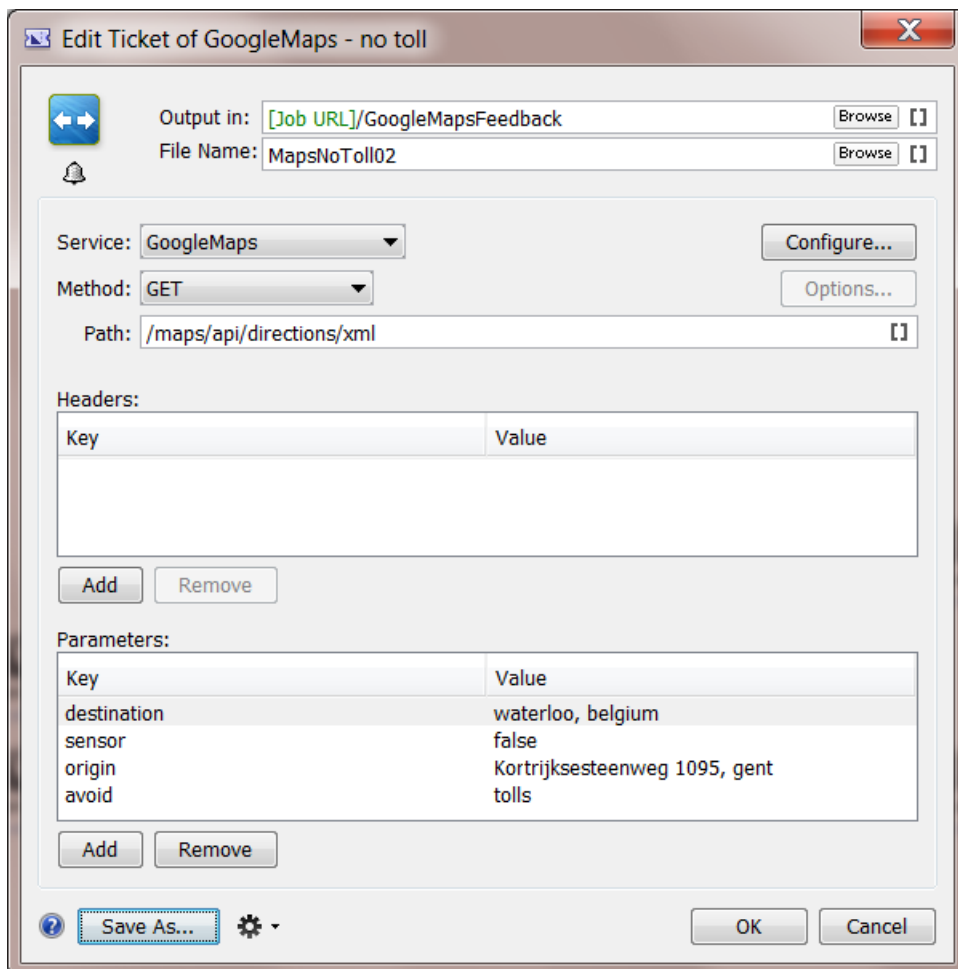
Output folder and File Name

Define here the path and name of your output file. The type of output file is defined by the API. We advise to choose XML.

When the **Method** is **GET**, this file will contain what the external system returns you. When the **Method** is any other type, the output file will only contain a status of the interaction (for example 'OK').

Service

Choose the web service from the list. Click **Configure...** to access the **Configure** tool where you define such external Web Services. Learn more in *this related item in the Configure tool*.

Method

There are various types of HTTP methods that you can send to a web service. Choose the method from the list:

- **GET**. This most frequently used method will retrieve data from that external system. Consider the URL as the question and the output file as your answer.

  For example: Ask Google Maps the distance from your company to your customer.

- **POST**. This method creates a new object on the external system.

  - This method is commonly used to post actual data, to upload a file to the external system. Therefore, click on **Options...** and choose to **Attach input files**. All input files are added to a single HTTP request and SmartNames are resolved in the context of the first input file. In case each input file must be sent separately, then add a **Data Splitter** task before the **Interact with Web Service** task in the workflow. In that case SmartNames will be resolved for each file.

    Note: The parameters are sent as "`application/x-www-form-urlencoded`" data. When XML files are attached, the data is sent as "`multipart/form-data`".

  - The POST method also enables to send a SOAP request. The exact text of the SOAP request needs to be put in an XML file and you need to add a single parameter "`SOAPAction`" with the needed value.

    Note: the **Create XML** task can be used to embed SmartNames inside the SOAP request.

    Note: Find an example in the *Esko Knowledge Base*.

  - **Options...**

    - **Attach input files**: Select this if you want to include the task input files into the POST.

    - **Use chunked encoding**: Select this to use "HTTP Chunked Encoding", which means there is no size limitation. This is advised when posting large files.

      Note: Note that this can only work if the receiving server supports this HTTP protocol extension.

      Note: When selected, it is also used for data that might *return* as a result of your POST command.

- **PUT**. This method requests the external system to store data or information under the given (existing) URL.

- **DELETE**. This method requests the external system to delete the information corresponding to the given URL.

- **Select SmartName...**. You can even use a SmartName to define the method.

Note: **PUT** and **DELETE** are only used for 'RESTful' web services. 'REST' is the main architecture style of HTTP. An alternative is 'SOAP'.

Path

This path will be documented in the API of the external system. APIs often present several paths that you can address.

In the above example of a ticket to access Google Maps, the information will be gotten from the 'directions' part of the API. The path ends with XML which here means that we choose to get an XML file back (and not a JSON file for example).

Headers

The API documentation will instruct you if you need to use HTTP headers. To do this, add their key and value in the **Headers** list.

Parameters

The API documentation will instruct you what parameters you can use. To do this, add their key and value in the **Parameters** list. This is where the actual 'question' will become more clear.

In the above example, you can see how the ticket asks Google Maps a distance between the origin and destination address. Other parameters could be more optional, like in this case the option to only calculate distances for routes that avoid toll roads.

Tip: Just Google "Google maps API" or click *here* to learn how Google Maps is a nice example of how an external system publishes its API.

Tip: *This page with examples* contains an example that uses the Google Maps API.

6.5. Interact with SAP task

The **SAP** access point and the **Interact with SAP** task serve to integrate with an ERP system from *SAP*.

Such integrations are managed through assistance from *Esko Solution Services*.

7. Tasks often used in Integration Workflows

7.1. Create Job task

7.1.1. Concept, Workflow and FAQs

The **Create Job** task creates an Automation Engine **Job** based on an XML input file containing the job parameters. Typically this input XML file comes from your business system. It is inside this system that the job-orders are decided and where many of its prepress production parameters are entered first. Typically, a **Folder Access Point** receives this XML file and then starts a workflow containing this **Create Job** task.

> **Tip:** Read more about the concept of integrating with external systems in *Introduction* on page 6.

> **Tip:** The chapter *Examples* on page 96 contains many examples where this task is used.

It is possible that the XML file that feeds this **Create Job** task does not come directly from the business system. Maybe you first have to combine it with another input file that contains other job parameters. Such other parameters could for example arrive as metadata inside a PDF. The data formatting tasks **Split XML**, **Join XML** and **Map Data** offer all tools to combine these parameters into 1 XML file.

Should the XML be in a specific format?

No, but it should be a valid XML of course. You will set up **SmartNames** or **XPath expressions** that map the vocabulary of that business system to the terminology required in Automation Engine. For example your business system uses the term 'Order Number' to describe the name of a job. You can then make a SmartName that maps 'Order Number' to 'Job Name'.

Can one XML file create multiple Jobs?

If your XML contains the description of multiple jobs, then you first need to split that XML into multiple XML files that each describe one job. To do that you will set up a workflow with the **Split XML** task in front of this **Create Job** task. Also use the **Data Splitter** task to make sure that the **Create Job** task is started for each incoming XML file.

Can the input file be a CSV file?
If you want to create a Job from a CSV file, then use the **Map Data** task to convert it to an XML file.

What if my business system can not export an XML file?

When your business system is not capable to export a job description in XML format, you can consider the alternative where Automation Engine asks your business system if there is a new job to be created. Learn about the various possible techniques in *Access Points* on page 16.

Can the task find its parameters outside the task's input file?

Yes. The input file of this task does not have to be the XML file that delivers all the parameters. It can even be a PDF. The parameters could also be looked for in other files than the task's input file. Some examples of such special setups:

- A **Create Job** ticket with a PDF as input file and where the SmartNames do SQL queries to an external database.

- A **Create Job** ticket with SmartNames that find their values in **workflow parameters**.

- A **Create Job** ticket with (SmartNames that are) Xpath expressions to some centrally stored XML that the business system writes there every night at 3 AM.

The **Create Job** task can get the values for its parameters from different sources. It can for example

- find the main job order specifications from the business system's XML file (name, ID, customer, due date)
- AND get the some ink information from the metadata of a PDF
- AND get a custom parameter 'Press' from a workflow parameter `[wfp.PressName]`.

What if the Job already exists? Can I use this task to update Jobs?

Yes you can also use this task to update existing Jobs. If Automation Engine detects that the Job already exists, it will update the Job with any new or changed values.

This task will function as an *Update Job* task

- when it sees that the [Job Name] already exists
- OR when it sees that the *combination* of [Job Order ID] and [Job Sub Order ID] already exists.

At the end of this chapter, you can find a sample XML that can be used to create jobs from. Remember that the format of the XML is free. This sample is not a template, it is just one example.

We will now document the settings in the different tab sheets.

Important: To set up a **Create Job** ticket, you need advanced knowledge of SmartNames.

7.1.2. Job
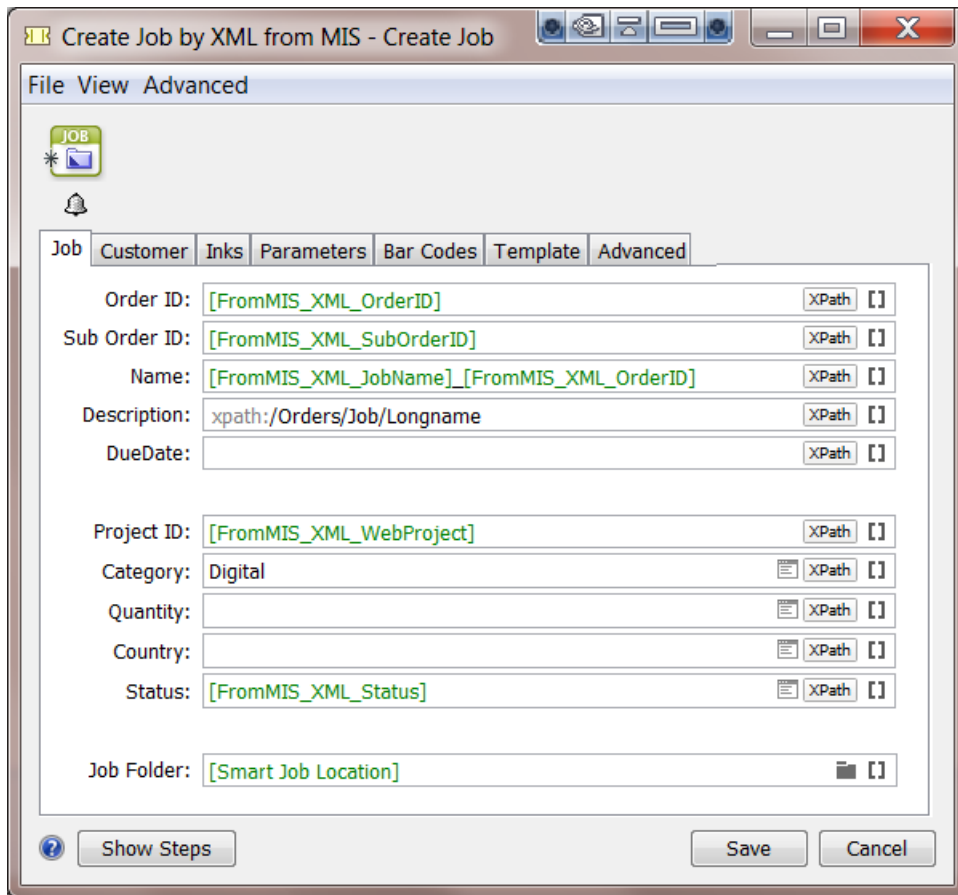
For most of the fields in this task, you can choose to set a SmartName or a combination of SmartNames.

You can also use an XPath expression to extract values from an XML file. Click XPath to use the *Xpath Builder* or if you are an expert in XPath, type them in yourself.

> ⚠ **Attention:** In the input fields that offer an XPath, it is not supported to insert a SmartName in your XPath expression! Still, the SmartName icon stays visible which might be confusing.
>
> In these fields, XPath expressions are **direct** 'inline' commands to the input file, which needs to be an XML file. In other cases, for example when the input file is a PDF file, you could use *SmartNames, which can also be built out of XPath Queries*. SmartNames are then a **indirect** way of getting the value (not 'inline').

- **Order ID**: This field must have a value. You can not leave it empty.
- **Sub Order ID**
- **Name**: In the screen shot example, we combined 2 SmartNames with some absolute text (_).
- **Description**:

> **Note:** The above example shows an XPath expression. If you are an expert in building XPath expressions, you can also directly type XPath expressions in this field. The syntax for doing this is "XPath:" followed by a valid XPath expression for the input file. Example: xpath:/Orders/Job/Longname

- **Due Date**: The format needs to be compliant with ISO 8601 (YYYY-MM-DDThh:mm:ssTZD). For example: `2014-07-28T12:00:00+01:00`
- **Project ID**:

> **Tip:** Some users use this field to define the name of the project on Esko WebCenter that corresponds with this Job..

- **Category**: For this field, you can also choose a category from the list.

> **Tip:** The categories in the list are all those that were already used in a Job.

- **Custom Field**s: The custom fields that appear here are the ones that you defined in **Configure > Jobs > Job Setup** (maximum 6). Alternatively to using a SmartName or XPath, choose a value from the list.
- **Job Folder**: The system needs to know where to create the actual folder for this Job.

> **Note:** Beware that you do need to define a *complete* network path here, not just a folder name.

You have these choices:

- Use the SmartName **[Smart Job Location]** to use this setting as defined in **Configure > Jobs > Smart Job Location**.
- Click ⬛ to browse to the desired job location.
- Click ⬛ to browse to a folder in a container, and then use SmartNames to define a subfolder.

> **Note:** If you want to make the path smarter by adding the name of the customer, then you best set that up as a **Smart Job Location**.

7.1.3. Customer

Using the same techniques as described for the tab 'Job', you here define the customer details for the Job you are creating.

- **Customer ID**. You can alternatively select the ID from the customer list panel.
- **Customer Name**.
- **Customer Description**.
- **Customer's Job Reference**. This is the name that your customer uses for this Job.
- **Customer Service Representative**. You can alternatively select the CSR from the list.
- **E-mail**.

7.1.4. Inks

Setting up the inks for the new Job can only be done if the input file is an XML file and if the ink properties are stored in attributes of XML elements.

In the example below the XML input file contains an element "Farben" (German for "inks"). This is an array of "Farbe" elements, each describing an ink.

```
- <Farben>
  <Farbe Farbbuch="Process" Farbtyp="Normal" Farbnamen="Cyan" Winkel="15" Lineatur="150" Punktform="CS4" Druckmethode="Offset" />
  <Farbe Farbbuch="Process" Farbtyp="Normal" Farbnamen="Magenta" Winkel="75" Lineatur="150" Punktform="CS4" Druckmethode="Offset" />
  <Farbe Farbbuch="Process" Farbtyp="Normal" Farbnamen="Yellow" Winkel="0" Lineatur="150" Punktform="CS4" Druckmethode="Offset" />
  <Farbe Farbbuch="Process" Farbtyp="Normal" Farbnamen="Black" Winkel="45" Lineatur="150" Punktform="CS4" Druckmethode="Offset" />
  <Farbe Farbbuch="PANTONE+ Solid Coated" Farbtyp="Normal" Farbnamen="PANTONE Warm Red C" Winkel="45" Lineatur="150" Punktform="R" Dr
  <Farbe Farbbuch="ClassicColors" Farbtyp="Opaque" Farbnamen="White" Winkel="45" Lineatur="120" Punktform="R" Druckmethode="Offset" /
  <Farbe Farbbuch="PANTONE+ Pastels & Neons Coated" Farbtyp="Transparent" Farbnamen="PANTONE 9284 C" Winkel="45" Lineatur="150" Punkt
  <Farbe Farbbuch="Designer" Farbtyp="Technical" Farbnamen="Die" />
  </Farben>
```

The **Create Job** task will create an ink in the new Job for each of these elements in the XML. The table in the dialog defines how to map XML attributes of each element to an ink property.
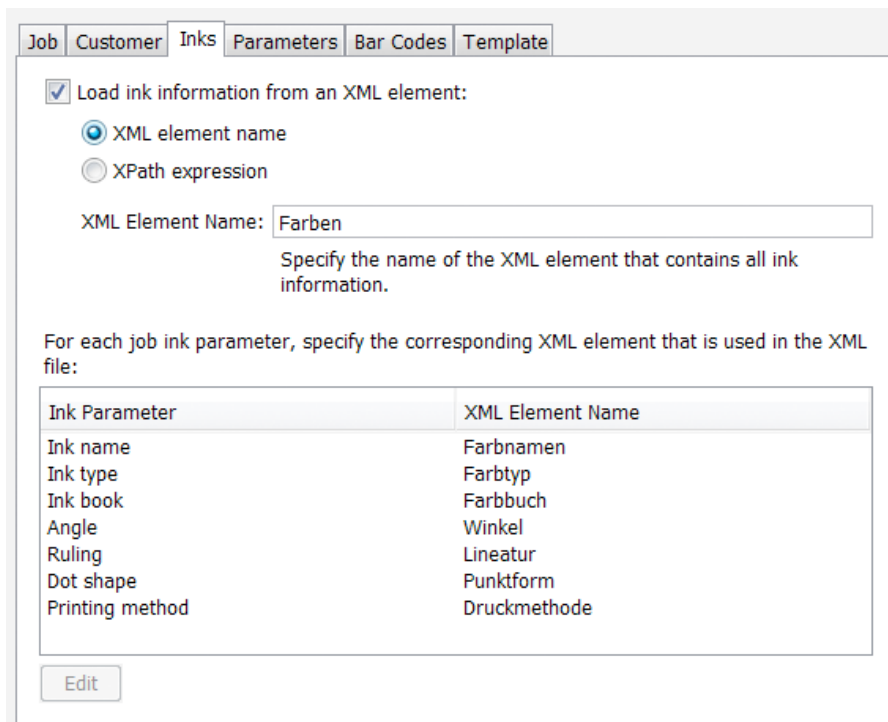
- **Load Ink Information from an XML element**. Enable this and then choose how you will load this specification: You have these 2 options:

- **XML element Name**: Indicate the XML element that contains the ink specification. In above example the ink info is described in the element `Farben`.

- **XPath expression** : Alternatively, use an XPath Expression to the XML element containing the ink information. For example: `/CreateJob/Farben`

Note:

- To open the **XPath builder**, select **XPath expression** and click on the **Edit** button in the text field.

- The XML that the ticket sees as input file will be loaded in the **XPath builder**. Alternatively, you can right-click in the canvas and choose **Paste from File...** to select the example XML input file.

- When you edit the XPath expression again, that same XML (example) input file will be automatically used.

For each job ink parameter, specify the corresponding XML element that is used in the XML file. To do this, select the parameter and click **Edit**.

- **Ink name**

- **Ink type**

- **Ink book**

- **Angle**

- **Ruling**

- **Dot Shape**

- **Printing Method**

7.1.5. Parameters

To add custom parameters to the job you are creating, click **Add** and enter its **Name** and **Value**.

Both fields are SmartName enabled. Typically, the **Name** will be an absolute value and the **Value** is a SmartName that extracts the custom parameters from an XML file.

For example:

Name	Value
Trapping	[FromMIS_XML_TrappingYesNo]
Trap Distance	[FromMIS_XML_TrappingDistance]

7.1.6. Bar Codes

The **Create Job** task also allows to add parameters for one or more bar codes.

Important: The **Create Job** task does not check the consistency of these bar code parameters. This means that the creator of the input file is responsible to create bar code parameters that are compliant.

You can **Add** or **Remove** parameters for multiple bar codes.

For each bar code, you can set the following parameters by adding a SmartName or an XPath expression. Some also offer to select a value from a list.

> ⚠ **Attention:** Some parameters will not be relevant for some bar code types.

- **Type**.
- **Sub Type**. A list will be offered if you selected a **Type** that offers **Sub Types**..
- **Code**. As mentioned above, the code is not checked for validation here.
- **Composite Code**. Only some types offer to add an extra composite code.
- **Output Resolution**
- **Bar Width Reduction**
- **Device Compensation**
- **Narrow Bar**. Only some types work with a specification of Narrow Bar and Ratio
- **Magnification**
- **Ratio**. Only some types work with a specification of Narrow Bar and Ratio

7.1.7. Template

You can use an existing job as a template job for the new job that you here create. If you decide so, you can select which attributes and parameters that you want to get from that template job.

> **Note:** For more information about using template jobs and their options, see the dedicated chapter *Jobs*.

Select **Use an existing job as a template** if you want to create your job based on another job.

In **Choose Job**, **Select** the job from the list or use a **SmartName** to have the job selected. An example of a SmartName could be `[customer name]_template`

Then choose what to **Include** from the template job into the new job:

- **Files**
- **Folders**
- **Hot Folders**. This item will only appear if your server still has hot folders from before v14.
- **Tickets**. These are the (blue) Job tickets.
- **Milestones**. Times will be set relative to the creation date of the new job.
- **Parameters**. Custom parameters.
- **Inks**.
- **Categories**

> ⚠️ **Attention:** If there any parameters that you pick up **both** from the input file and from a template job, then those from the input file will be kept.

7.1.8. Advanced

The **Create Job** task can automatically launch a workflow when the new job is created and even when the task updates the job.

To do this, select when you want have a workflow launched and select the workflow from the list. You can even choose both moments.

> **Note:** If the **Create Job** task itself is part of a workflow, the workflow that is chosen in this task will start immediately, as a separate workflow. It will not wait for the workflow that contains the **Create Job** task to finish.

The advantage of this function is that the chosen workflow will be launched *in the context of that created/updated job.* This means that all the used SmartNames will get their value from *that* job.

> ⚠️ **Attention:** In case you create a workflow that contains the **Create Job** task as a workflow step and then continues with other steps, then the tasks *following* that **Create Job** step will not run in the context of the new/updated job: they will run in the context where the (main) workflow initially started!

7.1.9. Sample Input XML

Click *this link* to find a ZIP with the samples used in the page '*Examples* on page 96'.

Download the ZIP file and unzip it to a local folder or directly into an **Automation Engine Container**.

In the folder named "Create a Job using XML", find a sample XML that you can use to test setting up SmartNames or Xpath expressions and so build and test an example of the **Create Job** task.

7.2. Add To Products task

The **Add To Products** task allows to create Automation Engine **Products**. The task can get their properties out of file names, paths, SmartNames or values out of XML data.

This task is often used after workflow steps first made a smart selection of input files.

This task is documented in the chapter *Products*. Find a direct link *here*.

7.3. Link Product To Job task

The **Link Product To Job** task allows to link or multiple **Products** to a **Job**.

This task is documented in the chapter *Products*. Find a direct link *here*.

8. Examples

These examples will help you build and understand the workflows of typical integration use cases.

At the beginning of each example, we also mention which tools and tasks are used. We also add a link where you can find the sample (XML) files used in that example.

Note: An example often requires you to understand the features explained in the previous examples.

8.1. Creating a Job using XML

Summary

We will create a **Job** based on the sample XML. Most of the work is creating the XPath Query SmartNames.

Tools used in this example:

- A sample XML describing 1 job order
- **SmartNames** including **Xpath Builder**

- The **Create Job** task

8.1.1. Step 1 – Analyze your Input XML file

Click *this link* to find a ZIP with the sample XML file used in this example.

Save the file in a logical place in an **Automation Engine Container**.

Open it (double-click) and have a look at its structure:

```
<?xml version="1.0" encoding="UTF-8" ?>
- <CreateJob>
  - <Job>
      <OrderID>002</OrderID>
      <SubOrderID>002123</SubOrderID>
      <Name>XMLsample_to_CreateJob</Name>
      <Description>A sample XML to test the Create Job Task.</Description>
      <DueDate>2015-06-01T09:00:00.00+01:00</DueDate>
      <ProjectID>Project123</ProjectID>
      <Category>Offset</Category>
      <CustomField1>CustomField1</CustomField1>
      <CustomField2>CustomField2</CustomField2>
      <JobFolder>file://AESERVER01/MainContainer/FruitCo/XMLsample_to_CreateJob</JobFolder>
    + <Barcode>
    </Job>
    <InkSpecifications>
    - <Ink>
        <ColorBook>Process</ColorBook>
        <ColorType>Normal</ColorType>
        <ColorName>Cyan</ColorName>
        <Angle>15</Angle>
        <Ruling>150</Ruling>
        <Dot>CS4</Dot>
        <PrintingProcess>Offset</PrintingProcess>
      </Ink>
    - <Ink>
        <ColorBook>Process</ColorBook>
        <ColorType>Normal</ColorType>
        <ColorName>Magenta</ColorName>
        <Angle>75</Angle>
```

See how a lot of job info is inside the parent element '*CreateJob*' and how the ink information is inside a different parent element '*InkSpecifications*'.

Note: In this sample, even the full path for the *JobFolder* is filled in. This is usually not the case. A business system usually leaves it up to you to decide where to store your prepress data. Some MIS do want to control this as well. Advantage of already knowing exactly where your prepress files are is that they can then also show some of them to their MIS users (final PDF, JPEG..). However, most MIS will not decide that path for you but will ask you to let them know where you decided to create that JobFolder. In that workflow, the MIS usually wants you to a return them a XML containing that JobFolder path.

8.1.2. Step 2 – Create your SmartNames

SmartNames will read specific pieces of that XML and so populate the various properties of the Job you will create. To read parts of that XML, we will use SmartNames of the type **XPath Query**.

Note: You can also create SmartNames directly from within the **Create Job** task. However, because they are Xpath queries that involve a sample input file, we advise to create them using the main SmartNames tool . It will be somewhat easier to do it there.

1. Go to the SmartNames tool and indicate your sample input XML file
Because you will probably make a dozen new XPath SmartNames, it will be easier when you only have to indicate your sample input file once. Do this in the **Resolve all using:** section.

Note: You do not have to click on 'Show' at this moment.

2. Make a first XPath Query SmartName

1.
   In the SmartNames tool, in the top bar, click on to create a new SmartName.. Choose Type **XPath Query**.
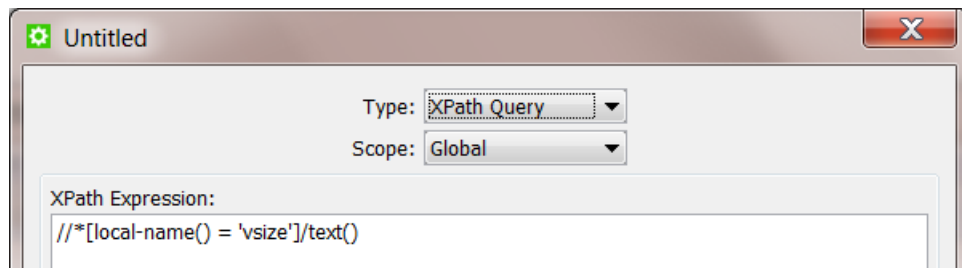
   An example query about 'vsize' appears. It will be removed automatically later. See the part `/text()` at the end. This means that the query will not select the full element but only the value of that element.

   At the bottom,
2. Click on 'Edit' to open the **XPath Builder**.
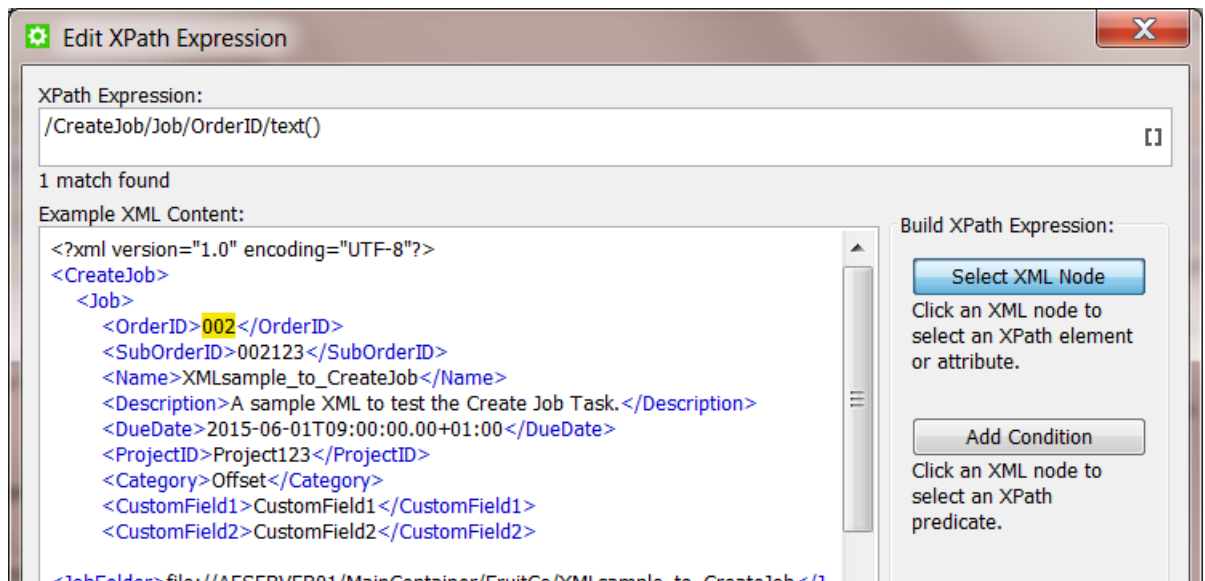
As a first SmartName, we will create the Xpath Query representing the Job's OrderID.

All you need to do here is click on the value that the SmartName will be looking for. It will be highlighted in yellow and the resulting XPath Expression will automatically appear in the top field.

3. Click on 'OK' to close the 'Edit Xpath Expression' dialog. The expression will have replaced the example one. The resulting value will also be shown bottom left in *'Result:'* (in below screen shot: "002").

4. Now save your new SmartName. Give it a logical name and maybe add some tags and a description.
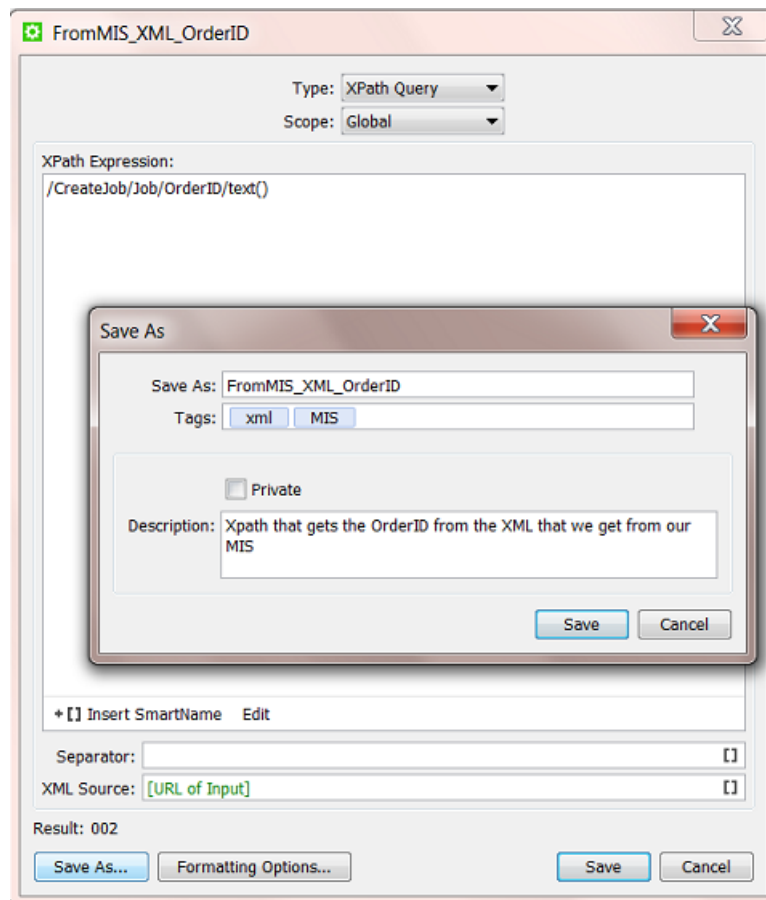
3. Now make the other SmartNames (quickly)

The next SmartNames will be made very similarly. Double click the one you just made and while keeping the SmartName dialog open, follow these steps:

- click **Edit**

- in the **Xpath Builder**,

    - click on the value you want the SmartName to represent
    - click **OK** to close the Xpath Builder

- click **Save As...** and enter an appropriate name, tag and descriptions

Repeat this for all the SmartNames you wish to use in the **Create Job** task.

8.1.3. Step 3 – Insert the SmartNames in the Create Job ticket

Open a **Create Job** ticket and insert the created SmartNames in their corresponding fields.
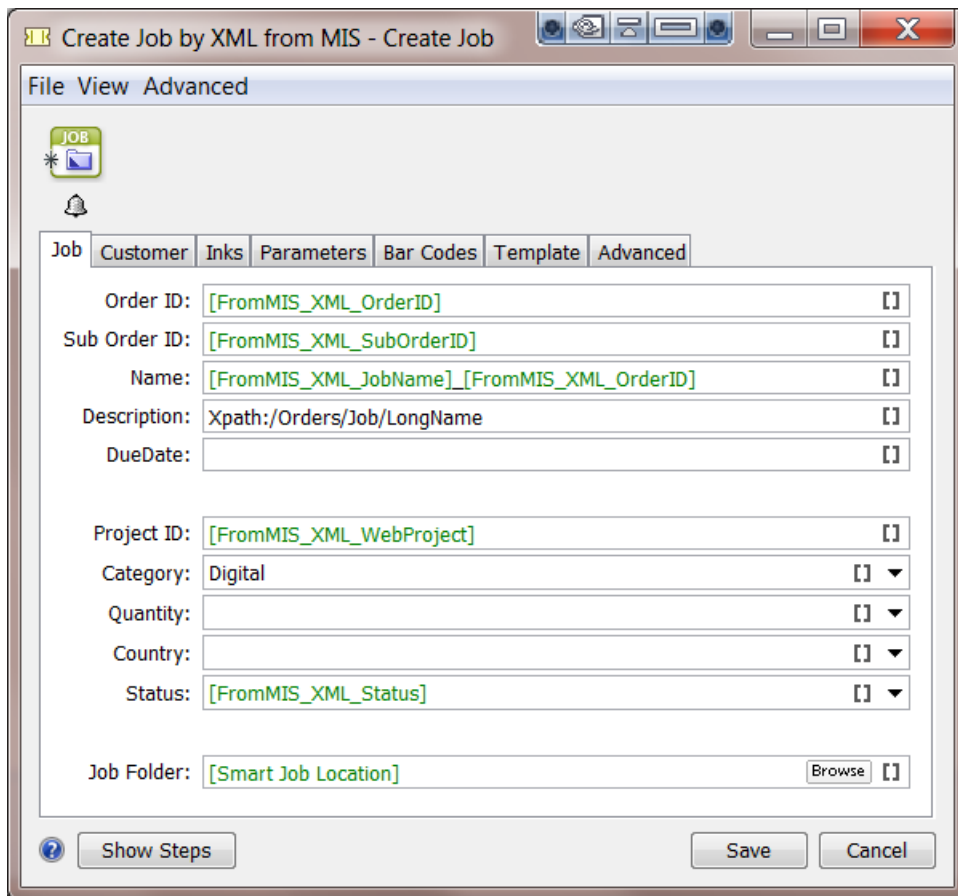
Do the same for all fields in the other tabs.

Don't forget to save your ticket.

Picking up the Ink parameters from the XML

As explained in *Inks* on page 90, the **Inks** tab is constructed differently.

In our sample XML, see how the ink information is described in a parent element **InkSpecifications**.
And in there, *per ink* in an element named '**Ink**'. And there are 8 inks described.

```xml
<?xml version="1.0" encoding="UTF-8" ?>
- <CreateJob>
  + <Job>
  - <InkSpecifications>
    - <Ink>
        <ColorBook>Process</ColorBook>
        <ColorType>Normal</ColorType>
        <ColorName>Cyan</ColorName>
        <Angle>15</Angle>
        <Ruling>150</Ruling>
        <Dot>CS4</Dot>
        <PrintingProcess>Offset</PrintingProcess>
      </Ink>
    + <Ink>
    + <Ink>
    + <Ink>
    + <Ink>
    + <Ink>
    + <Ink>
    + <Ink>
    </InkSpecifications>
  + <Customer>
  + <Parameters>
  </CreateJob>
```

You also see that the names of the ink parameters are not all identical to those used in the Job setup in Automation Engine. In many cases these words in the XML may not be in English. This terminology in the XML (in the business system) needs to be mapped to the official one in Automation Engine. This is explained in *the documentation of the Create Job task*.

See the correct settings for our example:

- The element name under which *all* the ink info is found is `InkSpecifications.`

- The parameter names in your XML (right) have been mapped to the standard names in Automation Engine (left):

Note: These names are not case-sensitive.

Note: If one XML Element name is wrongly mapped, the Create Job task will not fail but only this wrong parameter will stay empty in the Job Inks setup.

- Alternatively, in our example, You can use this **Xpath Expression** to select that element describing all the inks:

This is the result in the created Job:
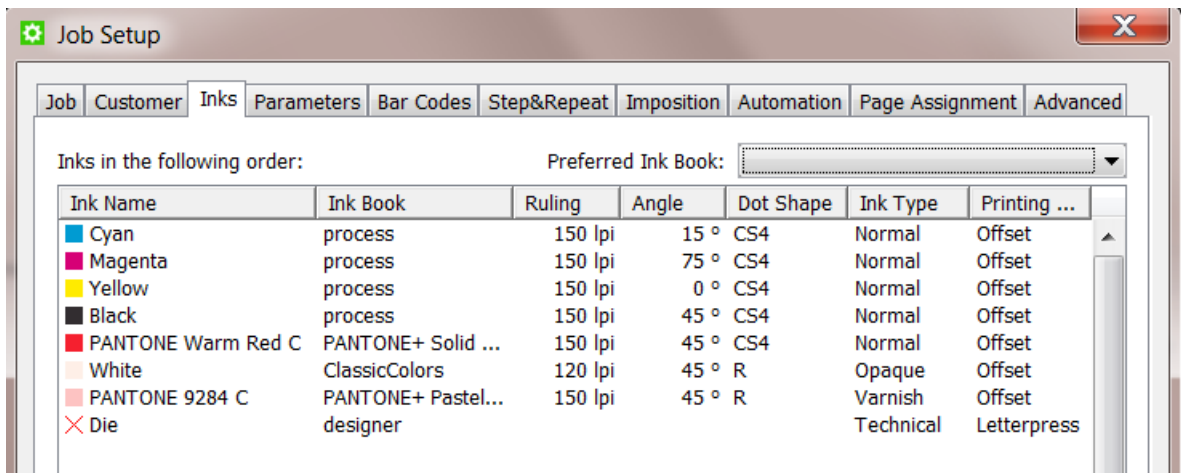
8.1.4. Step 4 – Test your Workflow

Test you workflow by launching it from within the Pilot.

In the Pilot, select the input XML file and launch the workflow. It should create the Job and the Job should contain all the parameters you had set up.

When the Job was created but one or more parameters were not found, the status of that 'Create Job' workflow step will be 'warning' (orange).

- The task's details info will already tell you that "*There were problems resolving some job fields*".

- The task's log file will tell you what specific SmartName(s) has a problem. For example "*Could not resolve(2) job.customer : <NameOfTheSmartNameThatFails>/*"

8.1.5. Step 5 – Add automation by starting this workflow from an Access Point

When an external system sends you a XML files describing Jobs to create, we advise to automate this workflow.

A typical way to do this is to create a **Folder Access Point**. The folder of that **Folder Access Point** is then the place where the XMLs will arrive. The workflow that the **Folder Access Point** will automatically start at a regular time interval is then the one you created in this example.

Note: Learn more on setting up such automation in *Folder Access Point* on page 17.

⚠ **Attention:** It is also common for external systems to send the prepress department you an XML file containing the description of **multiple job orders** . And often those systems only send such a list once or twice per day. This use case is explained in a next example *Creating Multiple Jobs from One XML* on page 105.

8.2. Creating Multiple Jobs from One XML

Summary

Note: This example requires you to master the features explained in the previous example *Creating a Job using XML* on page 96.

You receive an XML from the business system. It is a list of job-orders and their production parameters. Some are already started in prepress, some are new, some are on hold. Your goal is to create Jobs of all those in the status 'ReadyForPrepress'. The XML needs to be split into multiple XML files each describing one Job. These XML files are then input files for the **Create Job** task. The job-order info in the XML files is too elaborate. You will only pick up some selected parameters from those XML files.

Tools used in this example:

• **SmartNames** including **Xpath Builder**

• **Split XML** task

• **Data Splitter** workflow control

• **Create Job** task

8.2.1. Step 1 – Analyze the XML describing Multiple Jobs

Tip: Click *this link* to find a ZIP with the sample XML file used in this example.

The XML in this example describes the 3 job orders. See how 2 of them have the status 'ReadyForPrepress'.

```
<?xml version="1.0" encoding="UTF-8"?>
- <Jobs>
   - <Job>
        <OrderID>1404-W86203</OrderID>
        <SubOrderID>003</SubOrderID>
        <Name>1404-W86203</Name>
        <Description>Promo strawberry 100ml South Europe</Description>
        <DueDate>2015-06-01T08:00:00.00Z</DueDate>
        <Status>ReadyForPrepress</Status>
        <ProjectID>Project193</ProjectID>
        <CustomerID>2712</CustomerID>
        <Category>flexo</Category>
        <CustomField1>Nilpeter FB-2500</CustomField1>
        <CustomField2>White BOPP</CustomField2>
   </Job>
   - <Job>
        <OrderID>1404-W74536</OrderID>
        <SubOrderID>002</SubOrderID>
        <Name>1404-W74536</Name>
        <Description>New flavour Cocos and lemon </Description>
        <DueDate>2015-06-01T08:00:00.00Z</DueDate>
        <Status>OnHold</Status>
        <ProjectID>Project123</ProjectID>
        <CustomerID>2712</CustomerID>
        <Category>flexo</Category>
        <CustomField1>Gallus ECS 340</CustomField1>
        <CustomField2>OPP</CustomField2>
   </Job>
   - <Job>
        <OrderID>1404-W74599</OrderID>
        <SubOrderID>009</SubOrderID>
        <Name>1404-W74599</Name>
        <Description>New flavour Banana</Description>
        <DueDate>2015-06-01T08:00:00.00Z</DueDate>
        <Status>ReadyForPrepress</Status>
        <ProjectID>Project123</ProjectID>
        <CustomerID>2712</CustomerID>
        <Category>flexo</Category>
        <CustomField1>Gallus ECS 340</CustomField1>
        <CustomField2>OPP</CustomField2>
   </Job>
</Jobs>
```

Note: In this example XML, we removed typical extra parameters about the customer, bar code and inks. The principle of those types was already explained in *Creating a Job using XML* on page 96.

Attention: If you send this XML to the **Create Job** task, it would only create the first Job it finds in the XML.

8.2.2. Step 2 – Create the Workflow Ticket

This is the workflow we need:

- The **Split XML** task splits the XML into multiple XML files. If you don't do this, the **Create Job** task would only create the first Job is finds in the XML.
- The **Data Splitter** makes sure the next task sees the many input files. It prevents that the task is only launched on the first input file.
- The **Create Job** task creates Jobs, as determined in the **Data Splitter**, for *each* incoming XML file.

> **Note:** The **Create Job** has no output files. If you want to continue the workflow with its input files (the split XML files), then configure a specific **output pin** for that. Learn more on these possibilities in *The Workflow Editor* and also *Building Workflows* in the User Guide.

8.2.3. Step 3 – Splitting the XML but also using a Filter on Status

In the **Split XML** task, we need this XPath Expression:
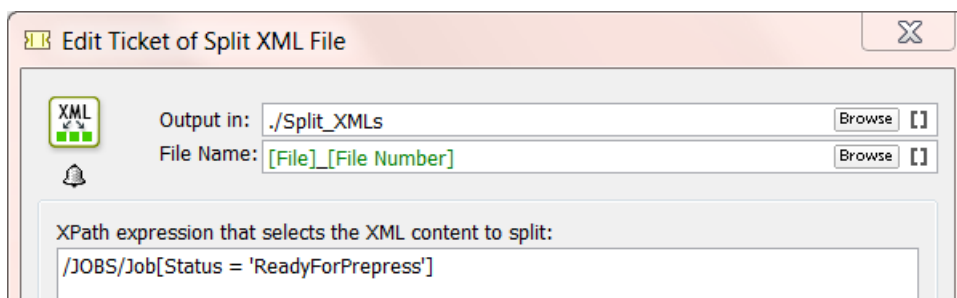
- The expression `/Jobs/Job` will result in splitting the XML on that level of elements: one per Job.
- The extra filter `[Status = 'ReadyForPrepress']` will limit that to jobs with that status.

This Xpath expression can easily be built by using the **Xpath Builder**. Open it via the **Edit** button.

> **Note:** When the filter does not find any matching 'node' (job), the task will error and mention this as the reason.

- **Output in:** Define where you want the split XMLs to be written.
- **File name:** Define the name of the split XML(s). The default setting will add a number.

8.2.4. Step 4 – Importance of the Data Splitter

When you do not use the **Data Splitter**, the **Create Job** task will receive all the XMLs generated by the **Split** task as 1 group on its input pin. In this case only the first incoming XML will be processed and the rest will be ignored. The **Data Splitter** step in this workflow will make sure the **Create Job** task receives the XMLs as separate files so each of them gets processed.

Because we (possibly) have multiple input XML files, we need these (default) settings:
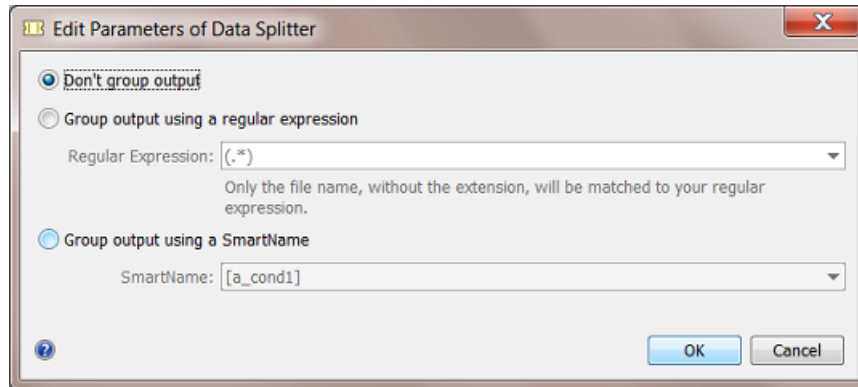
We do not want the split XML files to be grouped. The **Create Job** task needs to be launched on each one of them.

Find more details on this task in *Data Splitter*.

8.2.5. Step 5 – Create the Xpath SmartNames

Identical as explained in the previous example *Creating a Job using XML* on page 96, you need to

- create SmartNames that you will use in the **Create Job** ticket. As explained in *Step 2 – Create your SmartNames* on page 97.

- insert those SmartNames in the **Create Job** ticket. As explained earlier in *Step 3 – Insert the SmartNames in the Create Job ticket* on page 100.

8.2.6. Step 6 – Workflow Result

Select the XML describing multiple Jobs and launch your workflow.

The **Create Job** task will be started per incoming XML. In this case 2 times, because only 2 had the status 'ReadyForPrepress'.

File Name	Task Type	Progress	Phase	State	Launched
Job Orders today_2.xml	Create Job	100%		✓	7/11/14 2:49 PM
Job Orders today_1.xml	Create Job	100%		✓	7/11/14 2:49 PM
Job Orders today.xml	Split XML File	100%		✓	7/11/14 2:49 PM
Job Orders today.xml	**Workflow**	**100%**		⚠	**7/11/14 2:49 PM**

Note: Workflow controls like the **Data Splitter** do not appear in this task overview.

See the files the workflow created:
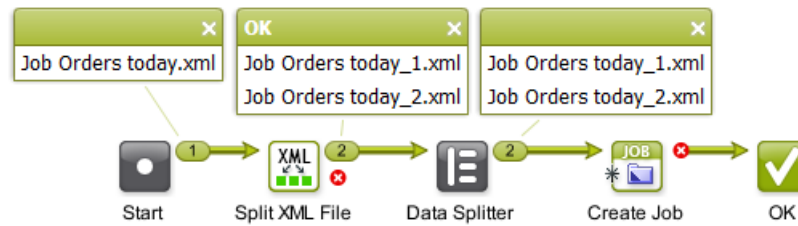
The 2 Jobs that had the status 'ReadyForPrepress' will be created:

Name ▾	Description	Due Date	Order ID	Sub Order ID	Customer Name
📁 1404-W86203_003	Promo strawberry 100ml South Europe	Jun 1, 2015	1404-W86203	003	FruitCo
📁 1404-W74599_009	New flavour Banana	Jun 1, 2015	1404-W74599	009	FruitCo

8.3. Create Multiple Jobs from a CSV file

Summary

Every morning, you receive a CSV file from the planning department with a list of job orders for the prepress department. Each row in the CSV represents a job order. This data needs to be converted into separate XML files to send to the **Create Job** task.

Note: a CSV is a Comma Separated Value file. This is usually an exported file from a database or an XLS file.

Tools used in this example:

- **SmartNames** including **Xpath Builder**
- **Map Data** task
- **Split XML** task
- **Data splitter** workflow control
- **Create Job** task

8.3.1. Step 1 – Analyse the CSV file

Tip: Click *this link* to find a ZIP with the sample CSV file used in this example.

Our example CSV contains a description of 2 job orders.

	A	B	C	D	E	F	G	H	I	J
1	Order Nr	Customer	Customer Nr	DueDate	CSR email	Country	Process	Shipping	Preflight	Proof
2	EXA_CSV_Job01	FruitCo	2712	30-09-14	Franky.fruit@fruitco.com	USA	Flexo	Fedex		Web
3	EXA_CSV_Job02	Toy Dream	1965	25-10-14	Tony.Toy@Toydream.com	China	Offset	DHL	Yes	PDF

Because the **Create Job** task does not work with CSV files, we first need to create an XML. And as you saw in the previous example *Creating Multiple Jobs from One XML* on page 105, we will need 1 XML *per Job* to create.

> **Note:** At this point it is good to detect any data fields that will need reformatting. In this example workflow, the format of the due date will need to be mapped to the format that is required for that field in the Job Setup.

8.3.2. Step 2 – Create the Workflow Ticket

This is the workflow that we need to create Jobs from a CSV with descriptions of multiple job orders:

- The **Map Data** task defines what parts of the CSV will be mapped into the XML file.

- The **Split XML** task splits that XML into multiple XML files, like we did in the *previous example*.

- The **Data Splitter** makes sure that the next task sees the many input files. It prevents that the task is only launched on the first input file.

- The **Create Job** task creates Jobs, one for *each* incoming XML file.

8.3.3. Step 3 – Mapping the CSV to XML

The **Map Data** ticket will

- convert the CSV to XML
- define which parts of the CSV are needed in the XML
- define how the parameters should be named in the XML. You can keep their names if you want to.
- define what part in the XML will be **Repeating Content**. This is needed because you are not sure how many jobs there will be in that CSV / XML. The CSV that you receive tomorrow can have a different amount of rows. This is the '*for each*' principle as explained earlier in *Specifying the Output File* on page 59.

> **Note:** The *order* in which we define the settings in this ticket is important.

1. Define the CSV as input file

- Select your CSV file and open the workflow ticket that you made in the previous step.
- Double click the **Map Data** step. This automatically sets your CSV as input file:
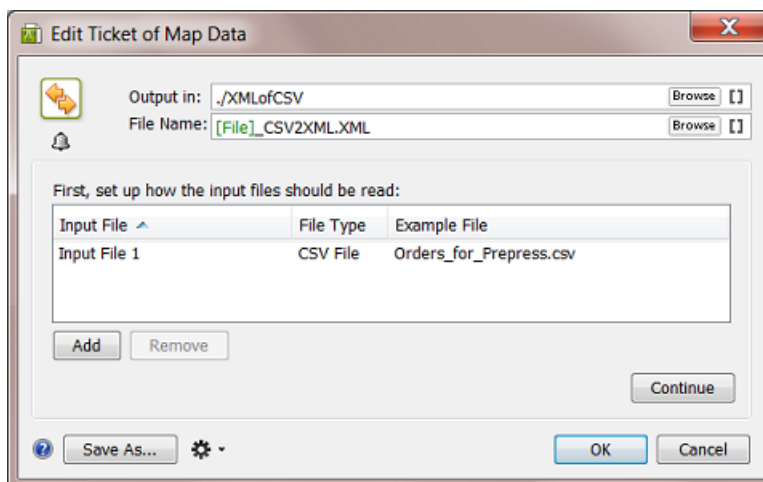
- Now set 2 specific options that define how our example CSV should be read. Double click the line 'Input File 1' to open its setup. Set the **Field Separator** to **Semicolon**. Because the first line of the CSV contains the field headers (not values we want to read), check the option **Ignore first line**. Remember that your specific CSV might be different, so do check all options.
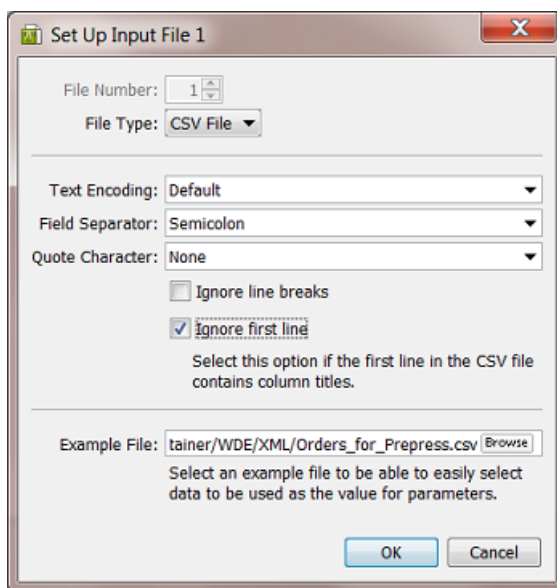
- Click **OK** to close that dialog.

- Maybe now is a good time to already define the folder and name of your output XML. As usual, you can use SmartNames in **Output in:** and **File Name:**.

- Click **Continue**.

- Make sure the **Output Format:** is on '*XML*'. In the **Options...** make sure to activate the **Replace reserved characters in parameter values with XML entities**. In this example, there are no such characters.

2. Define the Repeating Content in the XML

> **Note:** Make sure you have already read *the chapter documenting this advanced technology*.

This ticket allows many ways to use it. Following steps are specific for this CSV to XML workflow:

In the **Map Data** ticket, in the canvas where you define the output XML,

- Right-click and choose **Insert XML Declaration**. This is just good practice when creating XML.

- Right-click and choose **Insert Element** . Give it a logical names, for example `<Jobs>`

- Put your cursor in between the open and closing element, right-click and choose **Insert Repeating Content** (or click on ✦≡).

> **Remember:** You can not make any existing content 'Repeating' *later* ; you need to create the 'Repeating Content' block *first* and then add content inside.
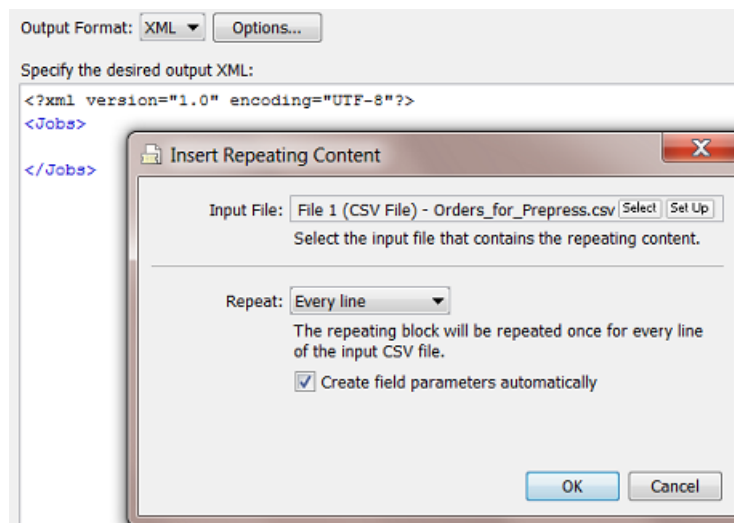
Every line (row) in your CSV represents a job order. So you do want **Every line** in your CSV to become the Repeating Content. Remember we already decided to ignore the first line of the CSV.

- Click OK. A pink field for **Repeating Content** is created. Also the field parameters were created automatically. They are colored pink because they are linked to the selected **Repeating Content** field.
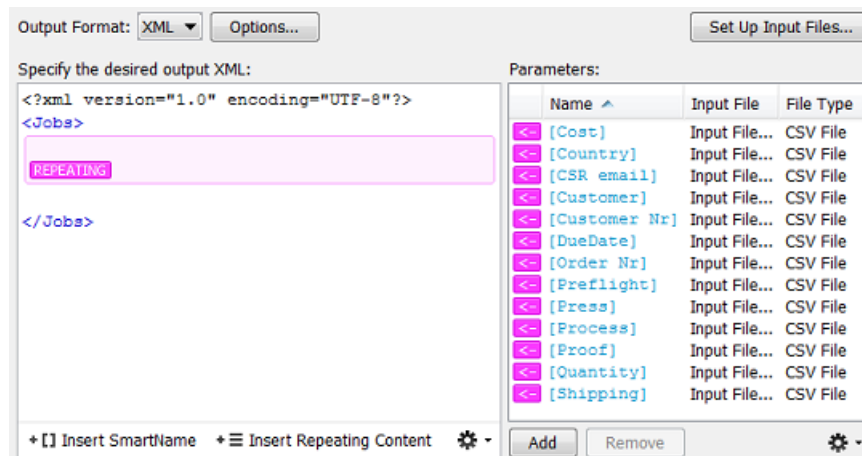
- Now, inside that **Repeating Content** field, continue specifying the content of the XML. Insert Elements and click the pink parameters in between the opening and closing element.

> ⚠️ **Caution:** Make sure your XML elements do not contain spaces!

This is a basic and valid example:
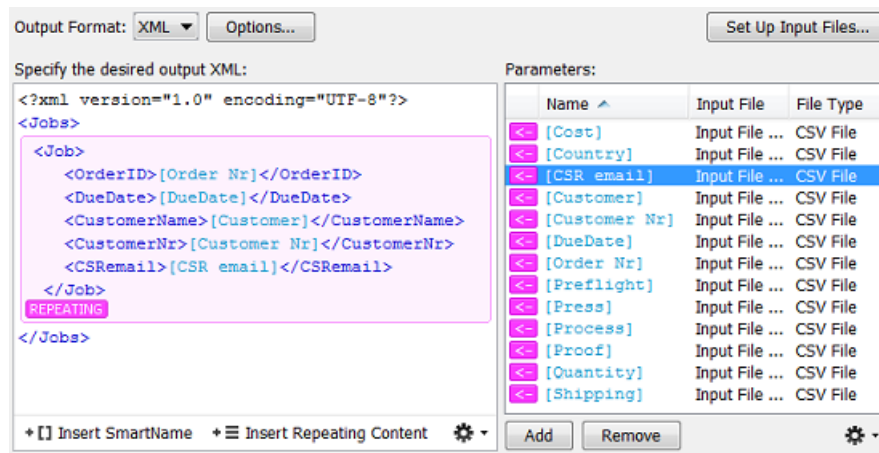
You can see we only use 5 of the parameters in this example. You can of course pick up a lot more.

> **Note:** Remember that the XML file will just be an in-between format. You will later, in the **Create Job** ticket, still map the XML elements to the real fields in the Job Setup.

- Click **OK** to close the set up of your **Map Data** ticket.

- Save your Workflow ticket. No need to close it.

8.3.4. Step 4 - Test your CSV to XML Mapping

We advise to already test what we set up in our **Map Data** ticket. Because if that output does not look good, it is better to correct that now instead of using a wrong XML file as input for the next workflow steps.

With the CSV as input file, launch the workflow. Because we haven't defined the settings for the next workflow steps yet, the workflow will surely fail.
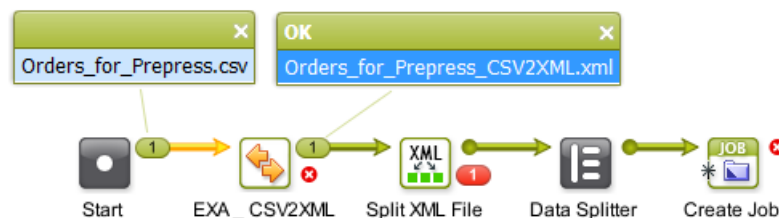
You now see that your CSV was mapped to an XML. Double click the output file to open it. It should look like this:

```
<?xml version="1.0" encoding="UTF-8" ?>
- <Jobs>
  - <Job>
      <OrderID>EXA_CSV_Job01</OrderID>
      <DueDate>30-09-14</DueDate>
      <CustomerName>FruitCo</CustomerName>
      <CustomerNr>2712</CustomerNr>
      <CSRemail>Franky.fruit@fruitco.com</CSRemail>
    </Job>
  - <Job>
      <OrderID>EXA_CSV_Job02</OrderID>
      <DueDate>25-10-14</DueDate>
      <CustomerName>Toy Dream</CustomerName>
      <CustomerNr>1965</CustomerNr>
      <CSRemail>Tony.Toy@Toydream.com</CSRemail>
    </Job>
  </Jobs>
```

You see

- the main structure */Jobs/Job*

- the description of the 2 Jobs,

- including the 5 parameters that we picked up from their definition in the CSV.

When your XML is not OK, then solve the problem first before defining the next workflow steps.

8.3.5. Step 5 – Set up the Split XML step

- Leave the workflow ticket and go back to your Pilot.
- Go to the folder where you wrote the output of the **Map Data** ticket and select the *Orders_for_Prepress_CSV2XML.XML*

- Open the default **Split XML** ticket. Your XML will be seen as input file.

- Click **Edit** to open the **Xpath Builder**.

- Click on a *Job* node

The resulting Expression will be shown above: `/Jobs/Job` .

- Click **OK** to close the dialog.
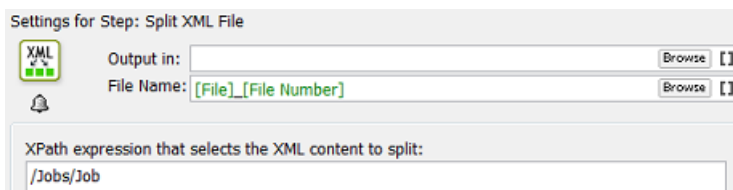
- Your ticket is ready. Save it with a logic name.
- Open your workflow and replace the default **Split XML** step with this specific one.
- Save your workflow.

8.3.6. Step 6 – Test your workflow again

- Select the CSV and launch your workflow. Because we haven't defined the settings for **Create Job** ticket yet, the workflow will surely fail.

  What you now need to see is the 2 XMLs as output of the **Split XML** ticket.
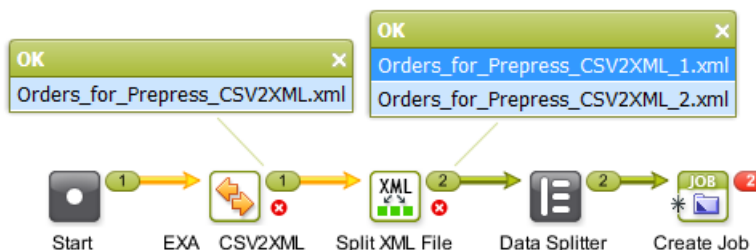
- Double-click one of the split off XML files to open it. It should look like this:

8.3.7. Step 7 – Check the Data Splitter

The **Data Splitter** control in your workflow should have the (default) settings to **'not group'**. It's purpose is identical as in previous example, where we explained *the importance of the Data Splitter*.

8.3.8. Step 8 – Defining the SmartNames for the Create Job ticket

Making the SmartNames and inserting them into your **Create Job** ticket is not different here than explained in earlier examples, like in *Step 2 - Create your SmartNames* on page 97 and *Step 3 - Insert the SmartNames in the Create Job ticket* on page 100. We will first briefly recapitulate that part and then we will pay extra attention to setting up the SmartName for the Due date.

Creating the necessary SmartNames

Follow these steps to create the SmartNames:

• In your **Pilot**, go to the **SmartNames** tool.

• On the right, in **Resolve all using:**, select **A file:** and browse to one of the split off XML files (for example *Orders_for_Prepress_CSV2XML_1.xml*).

• Create Xpath Query SmartNames for

    • OrderID
    • CustomerName
    • CustomerID
    • CSRemail

Creating the SmartName for the Due Date

• In your **Pilot**, go to the **SmartNames** tool.

• Click on [ ] to create a New SmartName.

• Choose the type : Xpath Query.

• Click on **Edit**. In the XPath Builder, select the value for the element *DueDate*.

• In the setup of an Automation Engine Job, the due date needs to be specified according the ISO 8601 standard. We therefore need to reformat that date from how it was defined in the CSV ('*30-09-14*'). Now set the formatting options as follows (see screen shot below):

    • Click on **Formatting Options...**.
        • Set the **Data Format** to **Date and Time**.

- Set the **Format** to **ISO 8601**.

- Choose your **Time Zone** (the one of your Automation Engine server).

Below left in the dialog, you will see that the **Result** is still not OK.

- Click on **Input Format Options...**.

  - Set the **Format** to **Custom**.

  - Set the **Language**.

  - Choose **Custom Format**. Now write how your data was formatted in the CSV: `dd-MM-yy`.

    ⚠️ **Caution:** The month is here defined by an 'M' in capitals! A lowercase 'm' will be seen as minutes!

- Click **OK**. The correct result should now be visible in the **Formatting Options** dialog.
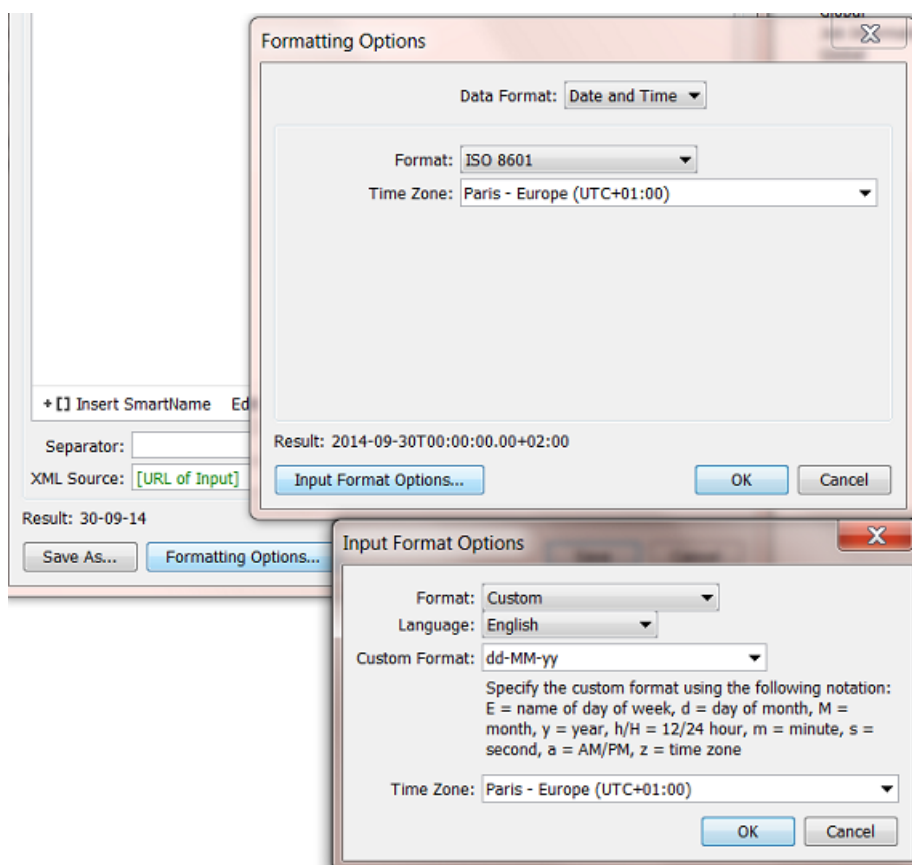
Now save your SmartName and give it a logic name. For example "*From XML - CSV Due date for ISO*".

The resulting Create Job ticket

- Open the workflow and double-click the **Create Job** ticket.

- Add your SmartNames. It could look like this:

- Now save your workflow ticket.

8.3.9. Step 9 – Workflow Result

In the **Pilot**, select your CSV file and launch your workflow. It will look like this:
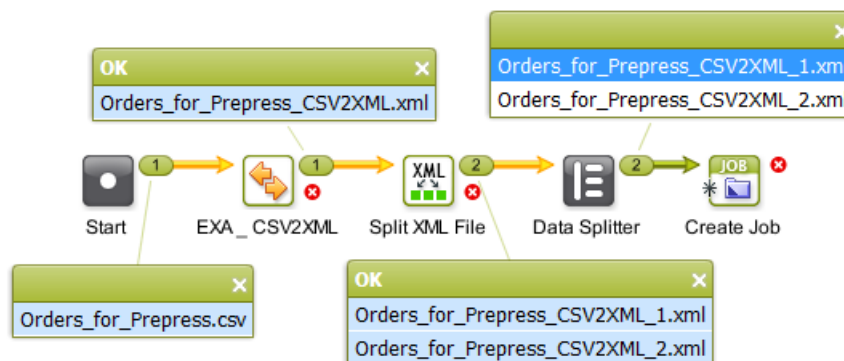
It will have created these 2 Jobs:

8.4. Creating Jobs using a Database Access Point

Summary

We will use a **Database Access Point** to query an external database (one from a business system where the job orders originate). The query will, at a regular time interval, ask that database which new Jobs need to be created on Automation Engine. The result of this query are XML files with the description of those Jobs. Those XML files will be used to create the Jobs (as shown in *previous examples*).

Tools used in this example:

* An external database
* A **Database Access Point**
* **SmartNames** including **Xpath Builder**
* The **Data Splitter** workflow control
* The **Create Job** task

8.4.1. Step 1 – Analyse the External Database

Tip: Click *this link* to find a ZIP with the sample database used in this example.

This is the database we will query in this example:
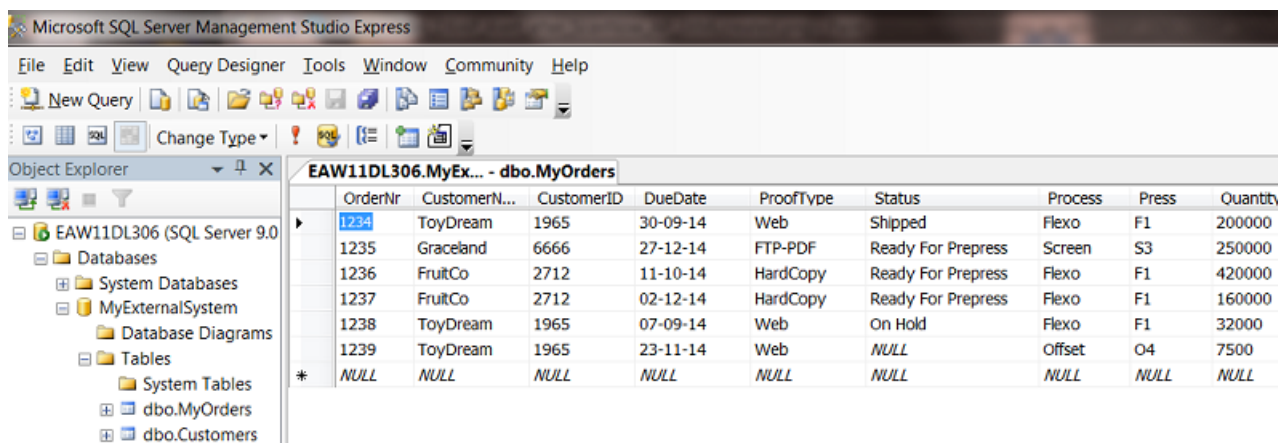
* The database software type is a MS SQL server.
* It runs on a a server computer named EAW11DL306.
* The name of the database that we will access is MyExternalSystem (there could be more served by this same software).

- The name of the (opened) table is `MyOrders`.

- The table contains the description of 6 job orders.

- The `Status` column shows that 3 job orders are `'Ready For Prepress'`. Those are the ones that we want to create on Automation Engine.

8.4.2. Step 2 – Configure the Link to the External Database

Set up the link with the external database. This is done in via **Tools** > **Configure** > **External Databases**. Learn more on such configurations in *External Databases*.

For this example, this is the configuration we need:

8.4.3. Step 3 – Set up the Database Access Point

> **Note:** Setting up **Database Access Points** is documented in *Creating or modifying a Database Access Point* on page 27.

This is an example of the Access Point we need:
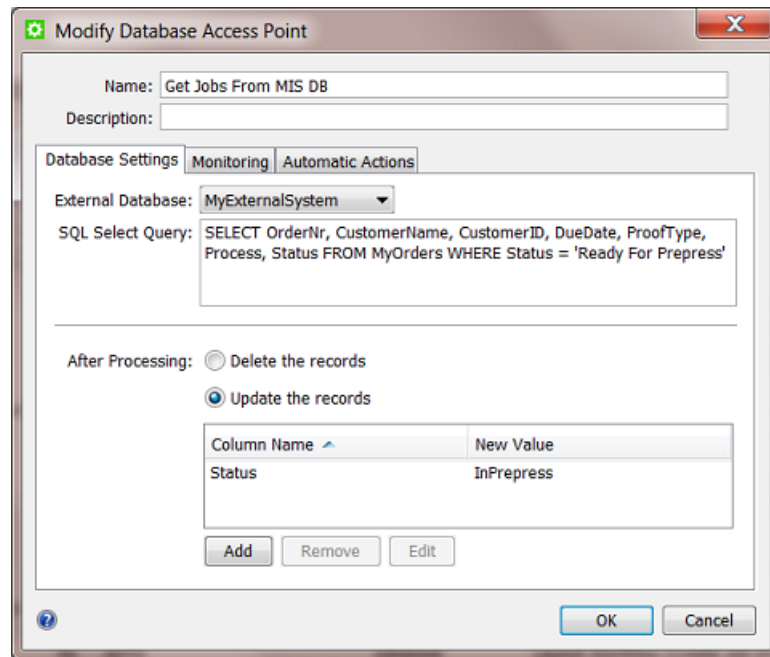
- In the **Pilot**, create a new **Access Point** and choose the type **Database.**

- Give it a logical **Name** and **Description**.

  Database Settings

- Select the **External Database** you configured in the previous step.

- Enter the **SQL Select Query**:

  - 'SELECT' indicates which columns you want to get a value from.

  - 'FROM' indicates the database *table* where these columns are.

  - 'WHERE' indicates an extra filter: you do not want *all* the jobs from that table, but only those with the status 'Ready For Prepress'.

  Note: SQL queries are case-sensitive!

  Note: It is possible to select values from different tables, for example if you want to get more details about the customer or about production tools. This examples does not do that.

  Note: Esko does not offer training or support in database queries. This is mentioned in more detail in *Concept of tasks interacting directly with external systems* and *Concept of the Interact with Database task*.

- **After Processing:** We here use **Update the records** to change the status field in the external database to 'InPrepress'. This is necessary to avoid that, after the next time interval, these jobs would be created/updated again (because they would still be in the status 'Ready For Prepress'.)

> **Tip:** You can choose to not do this status-update here but rather wait until the workflow really has created the **Job**. In the following workflow, you can then use an extra **Interact with Database** ticket to update that status in the external database with for example a status 'Job Created and Started in Prepress'.

Monitoring

Define the time interval with which the query should be done.

> **Note:** There is no need to set it to '1 minute' to make testing easier. See further how we will use the **scan now** button instead.

Automatic Actions
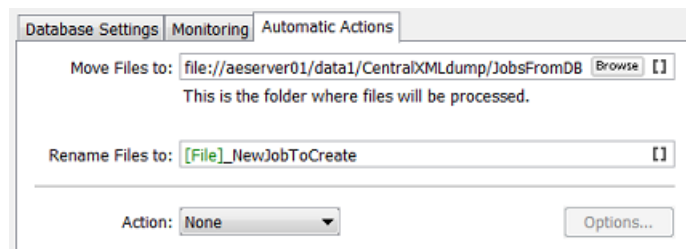
The query will write an XML file **for each** job order that it finds in the specified status.

- **Move Files to:** Define where you want those XML files to be written. The Job they represent does not exist yet so we advise to write them in some central folder. See an example in the screen shot.

- **Rename Files to:** Their default name `[File]` actually consists of `[table_name]_[date-and-time]`. You can overrule this or add more SmartNames. Also see later when we show the result.

- **Action:** We will add a workflow in later steps of this example. For the moment, leave this to `None`.

Click OK to confirm your settings

Your **Database Access Point** now exists.

Activate the Access Point

Right-click and choose **Activate Access Point**.
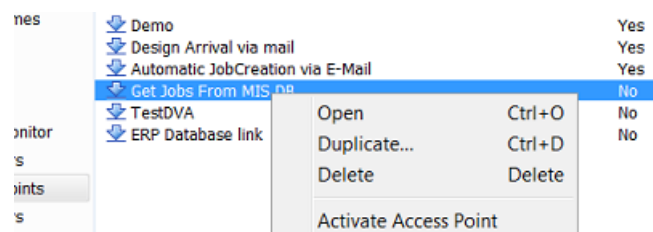
8.4.4. Step 4 – Test your Database Access Point

Select your **Database Access Point** and click the ⟳ button to **scan now**.

This will execute the SQL query immediately.

An **Alert** window will appear with the result. In our example, we see
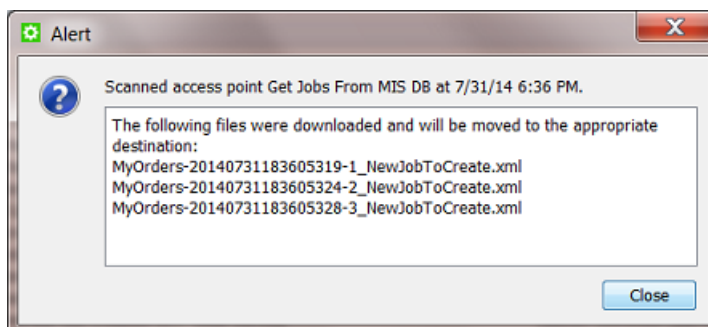
- 3 XML files were created because 3 job orders had the status that we were asking for: `Ready For Prepress`.

- Their name is the result of the SmartNames as explained in the previous step.

This is one of the resulting XML files:

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<MyOrders created="2014-08-01T12:52:56.928+02:00" producer="DBPoller-MyExternalSystem"
    select="SELECT OrderNr, CustomerName, CustomerID, DueDate, ProofType, Process, Status
    FROM MyOrders WHERE Status = 'Ready For Prepress'">
    <OrderNr>1235</OrderNr>
    <CustomerName>Graceland</CustomerName>
    <CustomerID>6666</CustomerID>
    <DueDate>27-12-14</DueDate>
    <ProofType>FTP-PDF</ProofType>
    <Process>Screen</Process>
    <Status>Ready For Prepress</Status>
</MyOrders>
```

See how the XML file contains the query that was used.

These XML files will now be used as input files to create Jobs.

Check the new status in the database

Remember the *Update the records setting in previous step*. See how, for the 3 job orders that first had the status `Ready For Prepress`, the status has now changed to `InPrepress`:

	OrderNr	CustomerName	CustomerID	DueDate	ProofType	Status	Process	Press	Quantity
	1234	ToyDream	1965	30-09-14	Web	Shipped	Flexo	F1	200000
▶	1235	Graceland	6666	27-12-14	FTP-PDF	InPrepress	Screen	S3	250000
	1236	FruitCo	2712	11-10-14	HardCopy	InPrepress	Flexo	F1	420000
	1237	FruitCo	2712	02-12-14	HardCopy	InPrepress	Flexo	F1	160000
	1238	ToyDream	1965	07-09-14	Web	On Hold	Flexo	F1	32000
	1239	ToyDream	1965	23-11-14	Web	*NULL*	Offset	O4	7500

> ⚠ **Attention:** When testing this **Access Point**, do remember that every time you run it that the status of those job orders will change to 'InPrepress' ! This means that the next time the **Access Point** will do nothing simply because there are no more job orders in that database with the required status 'Ready For Prepress'! So, in between tests, you have to manually reset those statuses to 'Ready For Prepress'. And remember that the queries are case-sensitive!

8.4.5. Step 5 – Create your SmartNames

Identical to how we did this in *step 2 of the first example*, we will now create the SmartNames that will map the fields in the XML to the Job setup fields in the **Create Job** task.

1. In the Pilot, go to the **SmartNames** View.

2. On the right, in **Resolve all using:**, check the button for **A file** and browse to one of the XML files you created in the previous step.

3. Click on **Create a New SmartName**.

4. In the dialog, indicate the type **Xpath Query**.

5. Click on **Edit** to open the **Xpath Builder**.

6. In the XML content, highlight the first value you want to make a **SmartName** for. For example OrderNr.
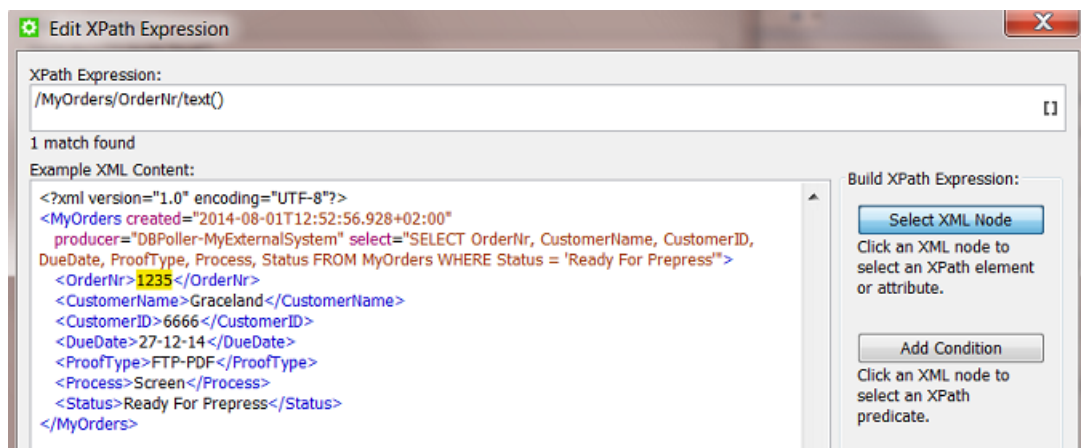
The resulting **Xpath Expression** will appear.

7. Click **OK**.
   You will see the result value 1235 appear bottom left in **Result:** .

8. Click **Save As...** and give the new **SmartName** a logical name. For example `EXA_DB_Myorders_OrderNr`.

9. Keep the dialog open and click again on **Edit**. Repeat steps 6 to 8 for the next **SmartNames** that you want to make in this example, **except the SmartName for the Due Date**, that one needs an extra formatting. See next step:

10. Creating the **SmartName** for due date is here identical to how we did it *in the previous example*. You need to make sure the output format is according the ISO standard for this Job setup field. And you need to indicate how the input is constructed. In our example this is `dd-MM-yy`.

11. When finished saving all **SmartNames**, close the dialog (press **Cancel** or use **Save** for your last **SmartName**)

12. Back in the **SmartNames View**, type a view filter that will only show your 5 new **SmartNames** and then click on **Show** (right panel)
    You should now see this:
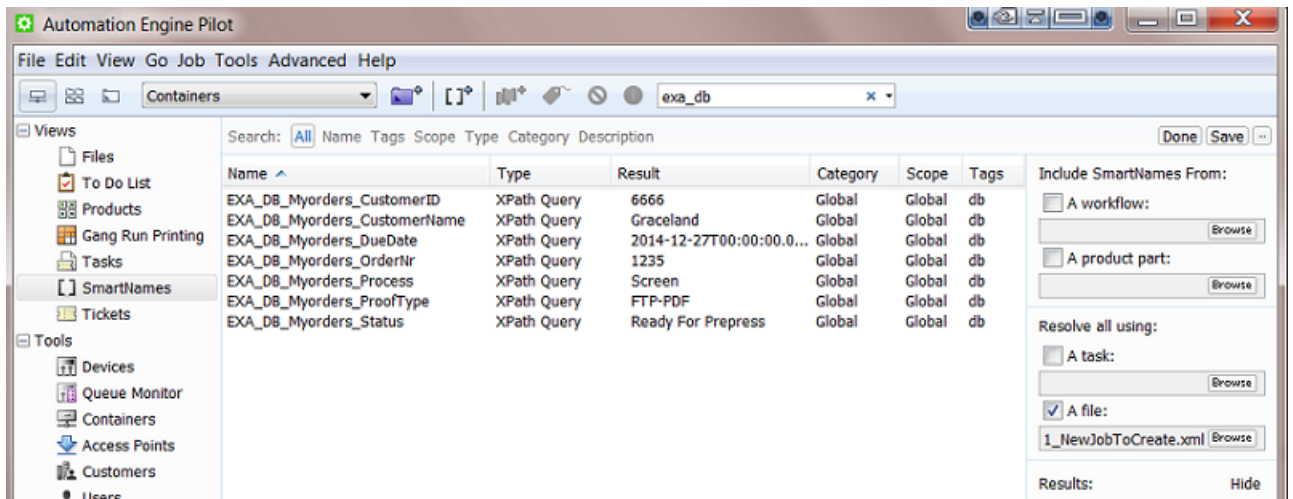
8.4.6. Step 6 – Create the Workflow with the Create Job task

To have the Jobs created automatically, create this workflow:

1. In the **Pilot**, go back to the **Files** or **Job** mode and click on 🖼️ to create a new **workflow**.

2. Build a workflow that starts with a **Data Splitter** (keep its default settings '**don't group output**'), followed by a **Create Job** ticket.

3. Already save your workflow with a logical name. Remember we will later attach it to the **Database Access Point**.

4. Double click the **Create Job** ticket and add the **SmartNames** to their matching fields.
    It should look like this:

The **Job Folder** setting in the screen shot is just an example of many ways to define it.

5. Save your workflow.

8.4.7. Step 7 – Test your workflow

In your **Pilot**, go to that (central) folder where your 3 XML files were written. Select these 3 input files and launch your workflow.
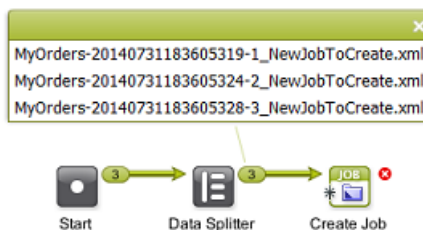
See how the **Data Splitter** receives 3 XML files and hands them over one by one to the **Create Job** ticket that creates these 3 Jobs:

Tip: Also check again if the due dates are formatted correctly.
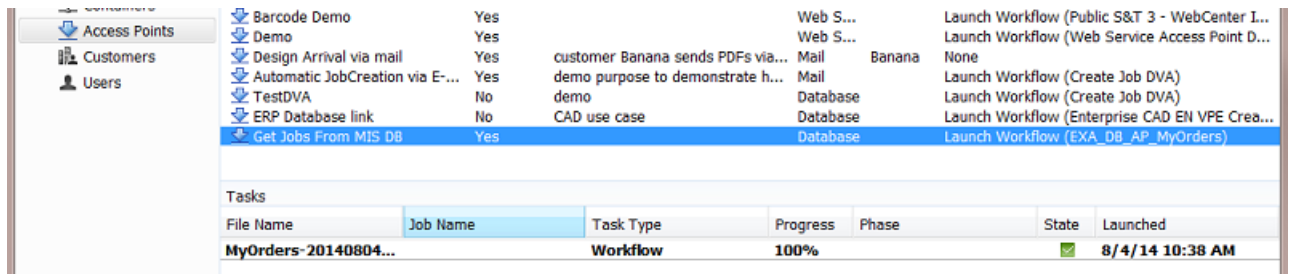
8.4.8. Step 8 - Add the workflow to the Access Point and test again

Open your **Database Access Point**. In **Action**, choose **Launch Workflow** and select your workflow. Click **OK** to confirm.
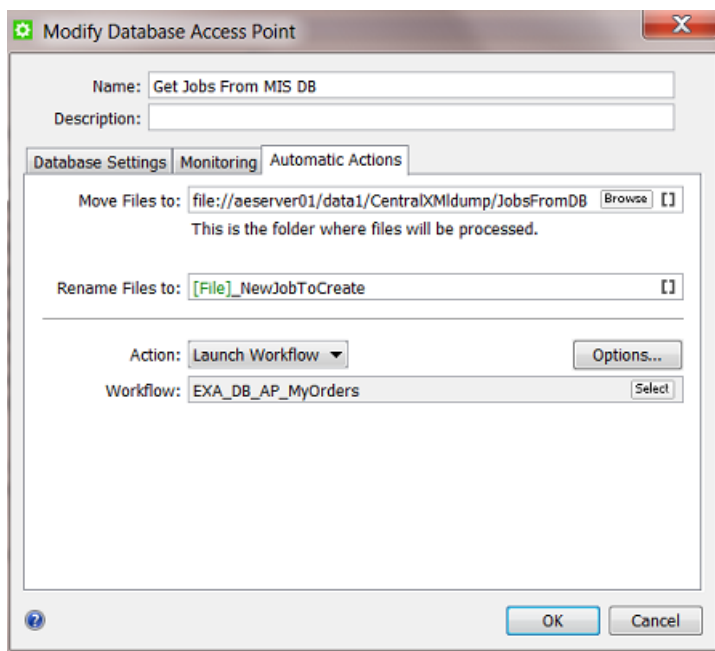
According the set time interval, your **Database Access Point** will run and now also use its resulting XML files as input files for your workflow.

When your **Database Access Point** is selected., you see the workflow task appear:

8.5. Launching a workflow with parameters from an XML

Summary

A workflow is automatically launched when the business system writes an XML file on a **Folder Access Point**. The **XML file describes what to do with what file**: it contains a full path to a new design file and describes many parameters that will be used as **Workflow Parameters** in the workflow that will be launched.

Such a concept is used by business systems that trigger a workflow on Automation Engine based on a new status. For example: when the business system notices that the status of a job order changes to 'Design Arrived', it decides to already start a prepress workflow on Automation Engine (the one that is typical for new designs from that customer). It is also common that such setups are not limited to only one status leading to one workflow. Some customers elaborate on this process and have 2 or 3 such links between a status in the business system and an automatically launched workflow on Automation Engine.

Tools used in this example:

- **SmartNames** including the **Xpath Builder**

- **Workflow Parameters**

- A **Folder Access Point**

- These tasks: **Preflight with PitStop**, **Create Report (ReportMaker)**, **Zip**, **Send E-mail**, **Upload via FTP**

- These workflow controls: **Select Referenced File**, **Router**, **Data Collector**.

Note: In this example we do **not use** Automation Engine's **Job concept**.

Note: This example assumes you are already comfortable making advanced workflows.

8.5.1. Step 1 - Analyse the incoming XML

Tip: Click *this link* to find a ZIP with the sample XML file used in this example.

This is the type of XML file that we receive from the business system:

```
<?xml version="1.0" encoding="UTF-8" ?>
- <Prepress>
  - <Workflow>
      <OrderNr>196570</OrderNr>
      <Description>Shrek Promo South America</Description>
      <CustID>1965</CustID>
      <CustName>ToyDream</CustName>
      <CustContact>Tony Sueno</CustContact>
      <CustContactEmail>tony@toydream.com</CustContactEmail>
      <Status>StartPrepress</Status>
      <JobType>Display</JobType>
      <Design>file://AEserver01/Data1/demo_container/MIS-XML-WFL DATA/Design Arrival/Shrek.pdf</Design>
    - <Preflight>
        <PreFlightYesNo>yes</PreFlightYesNo>
        <PreFlightProfile>CMYK Display</PreFlightProfile>
      </Preflight>
      <ReportCardYesNo>yes</ReportCardYesNo>
      <SendViaFTPorEMAIL>Email</SendViaFTPorEMAIL>
      <FTPFolder>ToyDreamFTP</FTPFolder>
  </Workflow>
</Prepress>
```

In the XML file, notice

- the job order number and some customer details
- a absolute full URL to the design file that just arrived. The design is named 'Shrek.pdf'.
- some decisions if the workflow needs preflighting or creation of a report card.

8.5.2. Step 2 – Create the Workflow

Now create the basic structure of our workflow. Add the steps as in the screen shot. We will add more detail later. It is possible that some of the connections can not be made yet.

Notice these main process steps:

- the workflow needs to run on the PDF, not on the incoming XML file that will land on the **Folder Access Point** (that we will create later in this example). That is why we will also use **Select referenced File** to select that 'Shrek.pdf' (see further).
- the workflow parameters will indicate whether the route to **Preflight with PitStop** and/or route to the **Create Report (ReportMaker)** needs to be taken.
- if the **Router** confirms that preflighting is needed, the step will do that and use a **Profile** defined in the XML.
- if the **Router** confirms that a design report card is needed, the **Create Report (ReportMaker)** will create that.

- the **Data Collector** collects the Preflight Report and/or the Design Report card, after which they are ZIP'ed together.

- the XML will indicate the next router if this ZIP needs to be sent to the customer via E-mail or via FTP.

Save your workflow with a logical name, for example `EXA_XML_Workflow`.

8.5.3. Step 3 – Load Workflow Parameters from the XML

The XML files that the external system sends will always have the same elements, but with mostly different values. This is a typical case to use **Workflow Parameters**.

> **Note:** Learn more about **Workflow Parameters** in *Workflow Parameters*.

1. Open the workflow you created and in the menu go to **Advanced** > **Manage Workflow Parameters**.
2. Check **Use values from XML file** and enter these SmartNames `[URL of Folder of Input]/ [File].xml` (see also in below screen shot).
3. Click on **Load Workflow Parameters from XML...** (below right). Browse to your XML example file and click **Open**. Choose to **Leave blank to select all elements below the root element**.
   All the XML element names will be listed, with their value from in this specific example XML:
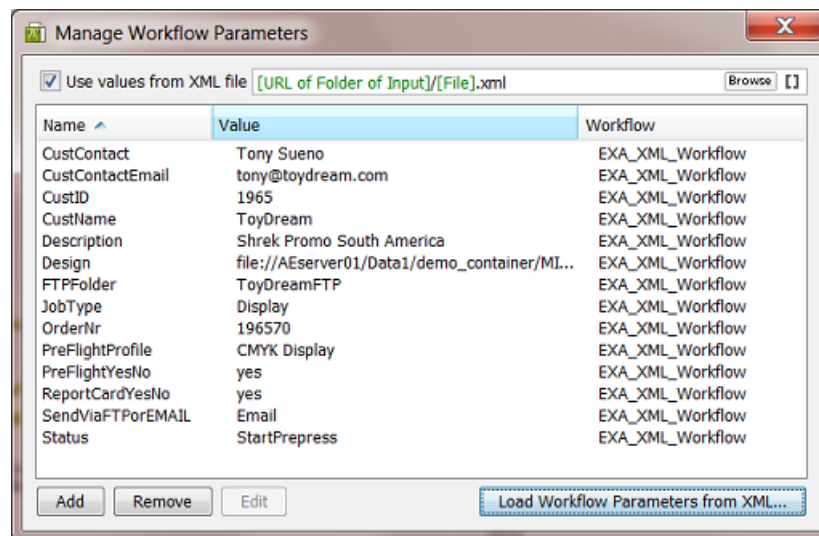
4. Click on **X** to close this dialog.
   These parameters are now **Workflow Parameters**. Every time this workflow is launched, they will be "loaded" before even starting the first workflow step.
5. Save your workflow.

8.5.4. Step 4 – Select the Design file that is Referenced in the XML

The workflow needs to run on the design file, not on the XML file. The design file is referenced in the XML file.

1. In the **Pilot**, select the example input XML file and then open the workflow you created.

2. In the workflow, open the step **Select Referenced File**.

3. In **Select by:**, choose **File Path**.

4. In **File Path**, click on **Edit** to open the **Xpath Builder**.

5. In the **Xpath Builder**, the input XML file of your workflow will be shown as **Example XML Content**.
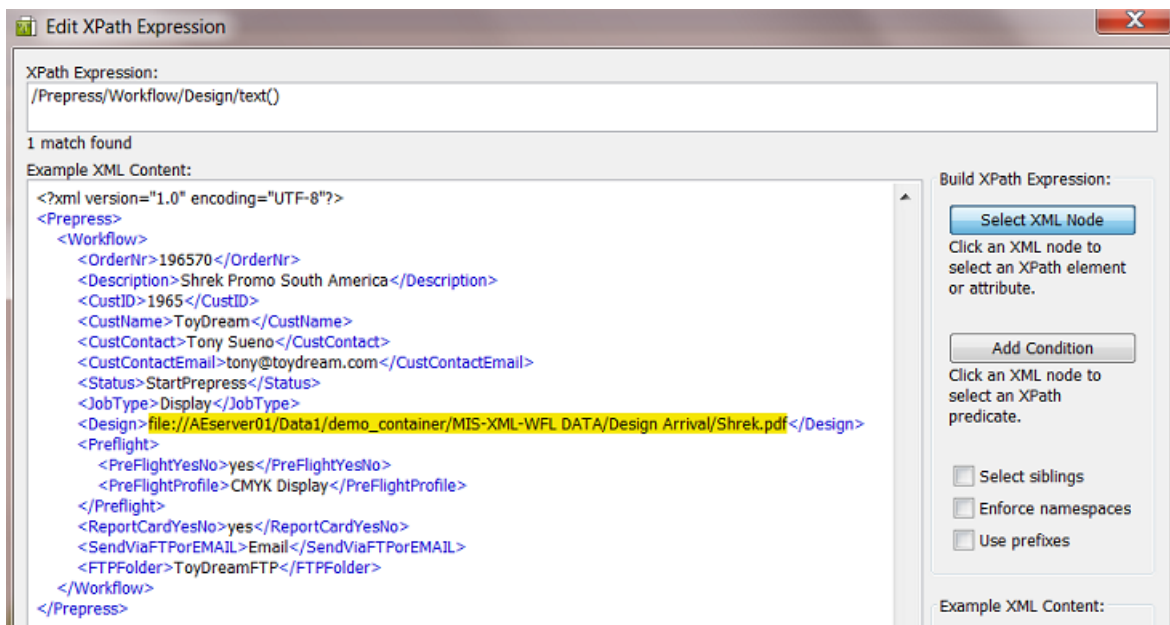
Select the path (the value of the *Design* element).
On top, the resulting **Xpath Expression** will be shown.

6. Click **OK** to close the **Xpath Builder**.
    The **Xpath Expression** is now copied as **File Path**.

7. Check the option **Provide a warning when no files were selected**.
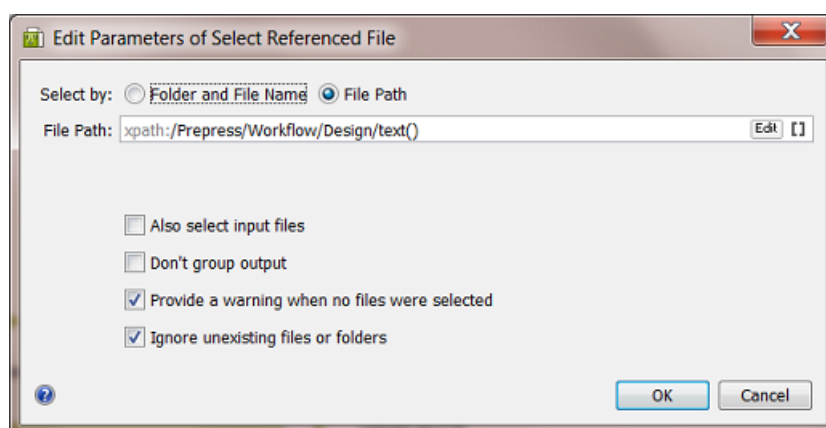
8. Click **OK** to confirm these settings.

9. Save your workflow.

8.5.5. Step 5 – Pick up the Workflow Parameters in your Workflow

We refer to the standard documentation to learn more on *making workflows* or on the tasks and workflow controls used in this example. We will here focus on what is specific in our example workflow.

Our workflow does not use the **Job** concept and we (therefore) use **Workflow Parameters**:

* in the **3 Router**s
* in the **Preflight with PitStop** step
* in the **Create Report (ReportMaker)** step
* in the **Send E-mail** step
* in the **Upload via FTP** step.

In the 3 Routers

A value in the XML decides where the workflow will route to. Follow these steps for each **Router** (they are very similar in all 3 **router**s):

1. In the workflow, open the **Router**.

2. In **Route based on**, choose **SmartName value** from the list.

3. In **SmartName**, pick the appropriate one from the list, category '**Workflow Parameters**' (`[WFP.)` and click **Insert**.
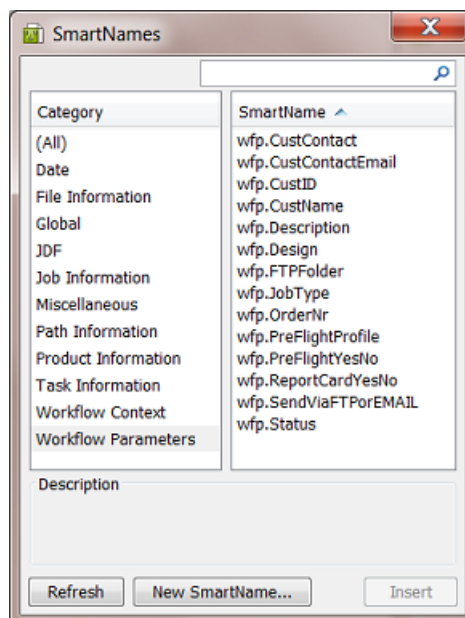
As can be seen in below screen shot, the 1st **Router** in the workflow needs the SmartName `[wfp.PreFlightYesNo]`. The 2nd **Router** needs `[wfp.ReportCardYesNo]`. The 3rd **Router** needs `[wfp.SendViaFTPorEMAIL]`.

4. Close the list of **SmartNames** by clicking on the **X**.

5. Now set the relation between the SmartName value and the route to follow.

See this example for the 1st **Router** deciding if preflight should be done:
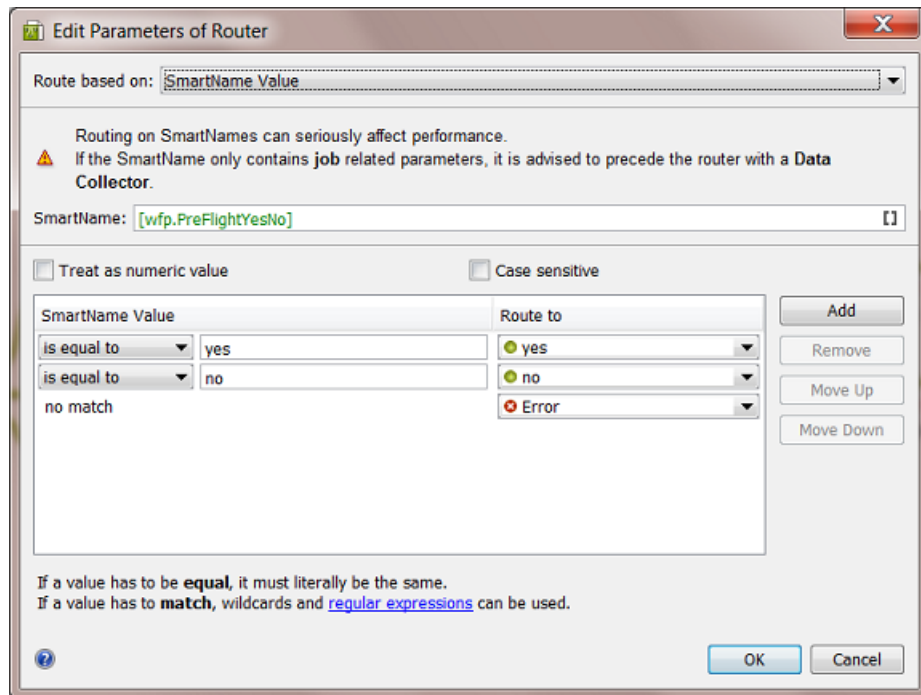
See this example for the 2nd **Router** deciding if a report card should be created:
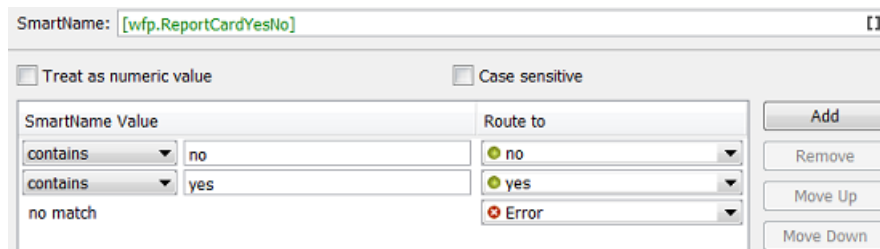
See this example for the 3rd **Router** deciding whether FTP or E-mail should be used:
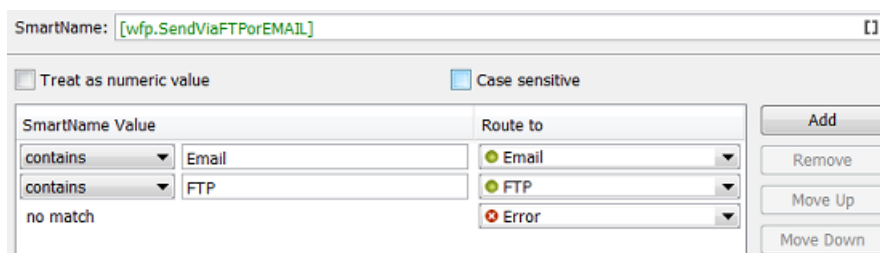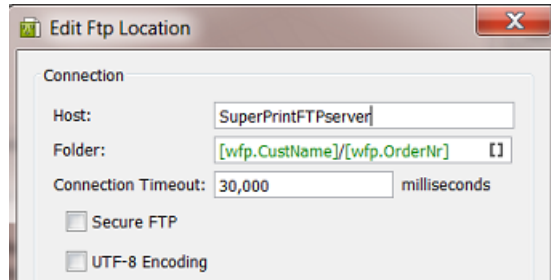

6. Click **OK** to confirm the Router settings and close the workflow step.
7. Save your workflow.

In the Preflight step

In our example, the XML file also decides which preflight profile needs to be used.

Note: See the full documentation of this workflow step in *Preflight with PitStop Task*.

1. In the workflow, open the step **Preflight with PitStop**.
2. Define the Output folder and name. Mind that this is not for the preflight report file.
3. In the **Preflight** tab, in **Profile**, insert the **Workflow Parameter SmartName** for the profile as part of the path.
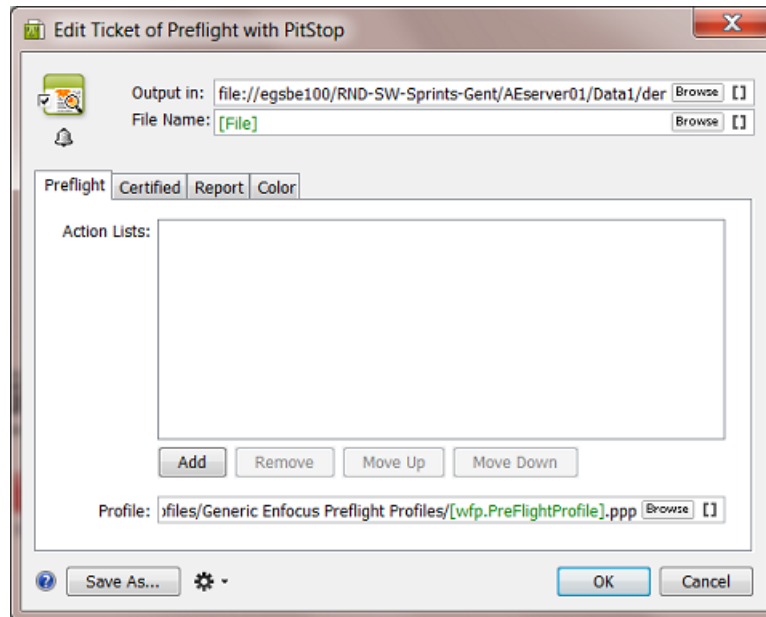
4. In the **Report** tab, define the output folder and name for the preflight report that you will send to the customer.
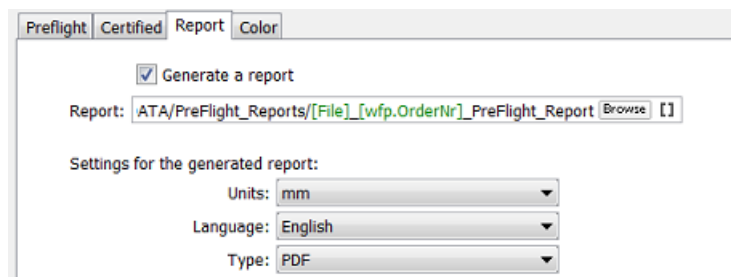
5. Set any other options as wished.
6. Click **OK** to confirm the settings and close this workflow step.
7. Now drag the logical connections between the steps. The pin that represents the output of the preflight report should link to the **Data Collector**. That file will be sent to the customer, the input design file will not be sent.

8. Save your workflow.

In the Send E-mail step

In our example, the XML file decides if the resulting files will be e-mailed or FTP'd to the customer.

Note: See the full documentation of this ticket in *Send E-mail*.

1. In the workflow, open the step **Send via E-mail**.

2. In **To**, add the **Workflow Parameter SmartName** for the E-mail of the customer contact for this job order.

3. In the **Subject** line, add the **Workflow Parameter SmartName** for the job order.

4. In **Message**, add the **Workflow Parameter SmartName** for the name of the customer contact.

5. Fill in extra fields as wished
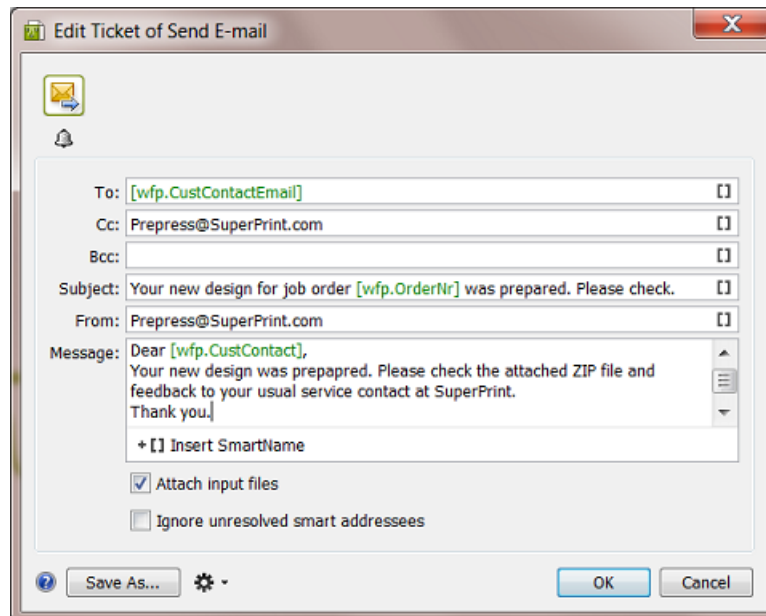
6. Click **OK** to confirm the settings and close this workflow step.

7. Save your workflow.

In the Upload via FTP step

In our example, the XML file decides if the resulting files will be e-mailed or FTP'd to the customer.

Note: See the full documentation of this ticket in *Upload via FTP* on page 43.

1. In the workflow, open the step **Upload via FTP** .

2. Enter the name of the **Host**.

3. In **Folder**, use the **Workflow Parameter SmartNames** to send the ZIP into a folder with a logical name. For example:

4. Set other settings as wished.

5. Click **OK** to confirm and close this dialog.

6. **TIP**: Optionally, you can send the customer contact an E-mail that his files are on the FTP server. Use the **Notification** tool of this workflow step to do this. Insert the **Workflow Parameter SmartName** for the E-mail and name, similar to how we did it in *the settings of the 'Send E-mail' step*.

7. Click **OK** to confirm the settings and close this workflow step.

8. Save your workflow.

8.5.6. Step 6 – Data structure of this Workflow

This is a workflow that does not use the **Job** concept, so you can not store all your data in subfolders of a **Job Folder**.

The data structure that this example workflow creates looks like this:
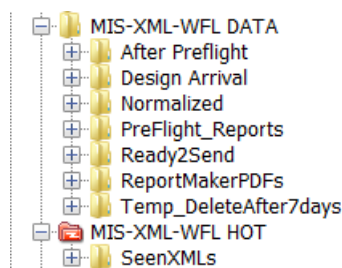
- The folder `MIS-XML-WFL DATA` contains all the data that this workflow creates. See the logical names of the (automatically) created subfolders. These folder names were set in the '**Output in**' fields of the relevant workflow steps.

- The folder `MIS-XML-WFL HOT` will be the folder used for the **Folder Access Point**.

## 8.5.7. Step 7 – Test the Workflow

1. In the **Pilot**, select your input XML file.
2. Then select the workflow you created and open it (double click).
3.
   Launch and Monitor: Press **CTRL-ALT-Enter** or Press **ALT** while clicking .
4. Drag the output file numbers so you can see these output files:
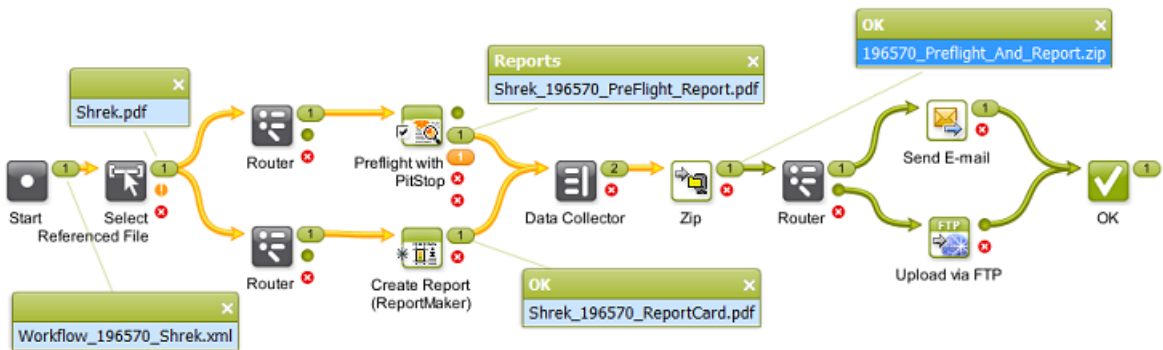

8.5.8. Step 8 – Create the Folder Access Point and Test Again

Note: If you are not familiar yet with **Access Points**, then first read *Access Points* on page 16.

1. In the Pilot, go to the **Access Points** view.
2. Create a new **Access Point** and choose the type **Folder**.
3. Give it a logical **Name** and **Description**.
4. In **Folder Settings**, indicate the folder where the external system will write the XML files.
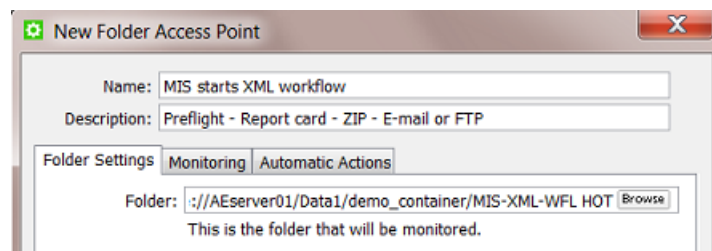
5. In **Monitoring**, set your preferred time interval.
6. In **Automatic Actions**, indicate the folder where the XML files should be moved to once they are processed.
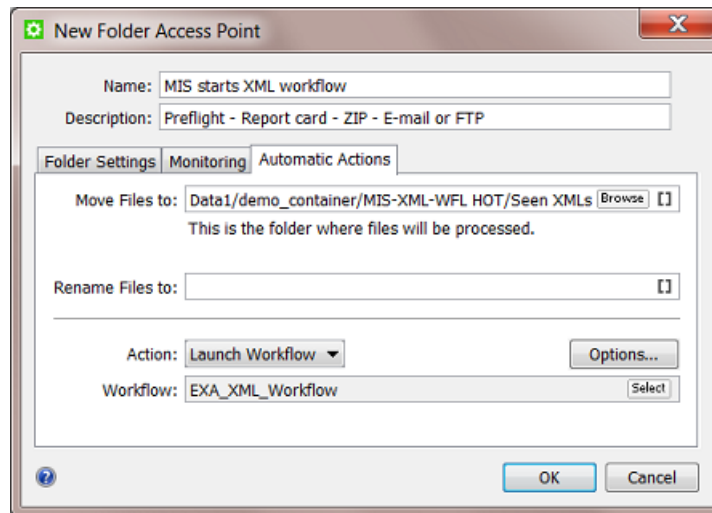
7. Set the **Action** to **Launch Workflow** and select the workflow of this example.

8. Click **OK** to confirm and close.

9. With the new **Access Point** selected, wait until the time interval passes or press '**Scan now**' to see the resulting tasks appear:

The screen shot shows 2 extra tests where the Preflight ended with a warning.

10. Check the workflow in more detail (output files and folders, XMLs with different options).

8.5.9. Step 9 – Possible Workflow Extensions

Here are some ideas to make this workflow even more powerful:

Feedback new status to MIS

It would be logic to inform the (business) system that sent you the XML on the fact that the workflow has finished. Here are some tips on how to do that:

- Adding a **Create XML** step to the workflow and send an XML with the status on a folder that that system will scan.

- Adding a **Interact with Database** step to the workflow and have a database query write that status right back into that system's database.

> **Note:** We can not use **Milestones** here because we are not working in a **Job** context.

Learn more about such possibilities in *Automation Engine sending data Back to the External System* on page 14

### Adding the Preflight Status already in the Email or Report File name

The customer might want to first check the designs where the Preflight showed an error or warning. To make this possible, you could extend the workflow to capture the Preflight status and use it as a SmartName. You could then insert that SmartName

- in the Email subject and or message
- in the FTP folder or name of the ZIP.

8.6. Getting info from a Web Service into a Workflow

Summary

Your company has printing plants in site A and site B. Automation Engine is in headquarters ('site HQ') where also the business system is. To enable a cheaper and faster delivery, your planning system asks Automation Engine which printing plant is closest to the customer, where the printed product should be shipped to ('site C').
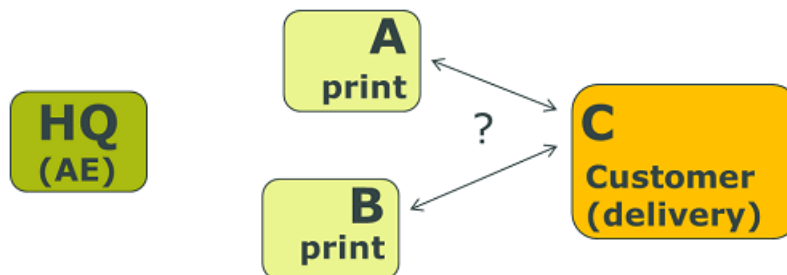
Automation Engine asks the web service of GoogleMaps the distances and reports the result back to the planning system. The planning system sends its request to Automation Engine via an XML file. Automation Engine will also send a result back as an XML file.

Tools used in this example:

- **SmartNames** using **Xpath Builder**
- **Workflow Parameters**
- **Interact with Web Service** task
- **Map Data** task
- The **Data Collector** and **Sort** workflow control

8.6.1. Step 1 – Analyse the Input XML

> **Tip:** Click *this link* to find a ZIP with the sample XML file used in this example.

In our example, this is the XML file that we get from the planning system (`RouteCalcRequest.xml`):

```
<?xml version="1.0"?>
- <RouteCalc>
    <OrderNr>234567</OrderNr>
    <CustomerID>6666</CustomerID>
    <CustomerName>Graceland</CustomerName>
  - <Delivery_Address>
      <Delivery_StreetAndNr>706 Union Avenue </Delivery_StreetAndNr>
      <Delivery_ZIP>TN 38103</Delivery_ZIP>
      <Delivery_City>Memphis</Delivery_City>
      <Delivery_StateCountry>USA</Delivery_StateCountry>
    </Delivery_Address>
  - <PrintSiteA_Address>
      <SiteA_StreetAndNr>2804 Opryland Drive</SiteA_StreetAndNr>
      <SiteA_ZIP>TN 37214</SiteA_ZIP>
      <SiteA_City>Nashville</SiteA_City>
      <SiteA_StateCountry>USA</SiteA_StateCountry>
    </PrintSiteA_Address>
  - <PrintSiteB_Address>
      <SiteB_StreetAndNr>726 Saint Peter Street</SiteB_StreetAndNr>
      <SiteB_ZIP>LA 70116</SiteB_ZIP>
      <SiteB_City>New Orleans</SiteB_City>
      <SiteB_StateCountry>USA</SiteB_StateCountry>
    </PrintSiteB_Address>
  </RouteCalc>
```

For job-order 234567, the planning system asks which printing site is closest to the delivery site in Memphis: A (Nashville) or B (New Orleans).

Note: This example contains address as they are written in the USA.

8.6.2. Step 2 – Configure the Web Service

As documented in *Interact with Web Service task* on page 83, the `GoogleMaps` API needs to be added in **Configure** > **External Web Services**.
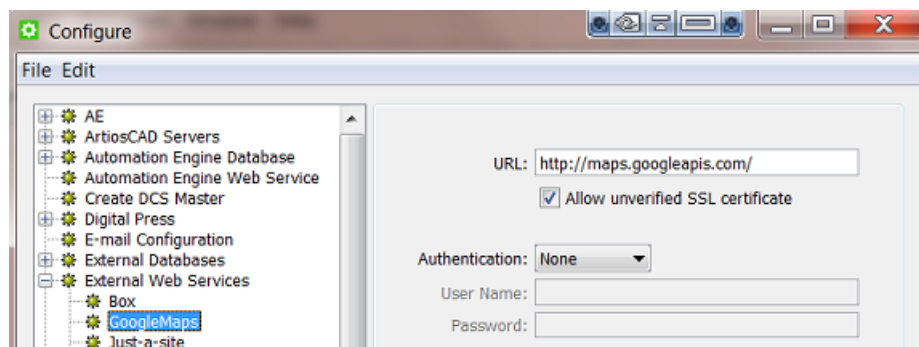
8.6.3. Step 3 – Create the workflow

Create a workflow with these steps. We will define some details later.

1. In Pilot, select the input XML file and create a workflow with these steps (the 2 'GoogleMaps' steps are **Interact with Web Service** steps.)

See how the workflow will use a **Map Data** step to join and partially redefine the outputs from the 2 interactions with `GoogleMaps`. Alternatively, you could make this workflow by using a **Map Data** step after each interaction with `GoogleMaps` step, and then later end it with a **Join XML** step.

2. Edit the names of the 2 **Interact with Web Service** steps to those as in the screen shot.

3. Save your workflow with a logical name. For example "`EXA - WEB - RouteCalc`".

8.6.4. Step 4 – Load Workflow Parameters from the XML

This example does not use the **Job** concept so we will create **Workflow Parameters** and pick those up throughout the workflow.

1. Open the workflow you created and in the menu go to **Advanced** > **Manage Workflow Parameters**.

2. Check **Use values from XML file** and enter theis combination of **SmartNames**: `[URL of Folder of Input]/[File].xml` (see also in below screen shot).

3. Click on **Load Workflow Parameters from XML...** (below right). Browse to your XML example file and click **Open**. Choose to **Leave blank to select all elements below the root element**.
   All the XML element names will be listed, with their value from in this specific example XML:
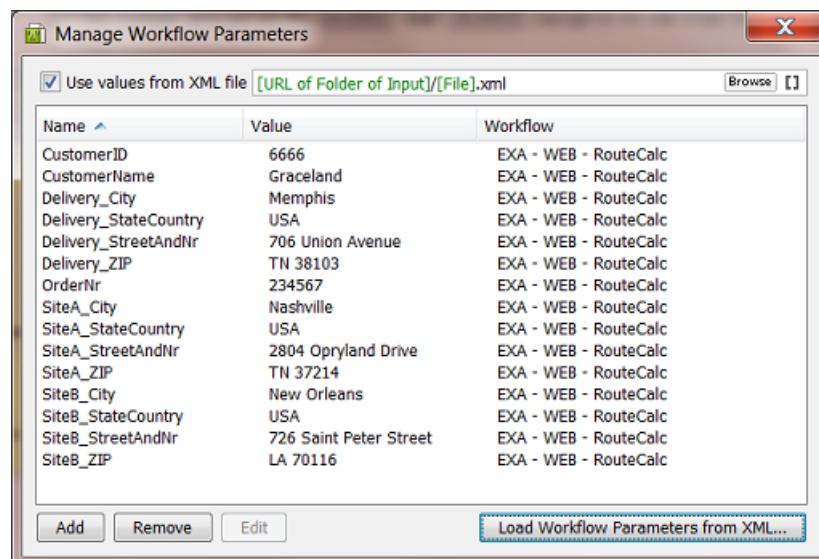

4. Click on **X** to close this dialog.
   These parameters are now **Workflow Parameters**. Every time this workflow is launched, they will be "loaded" before even starting the first workflow step.
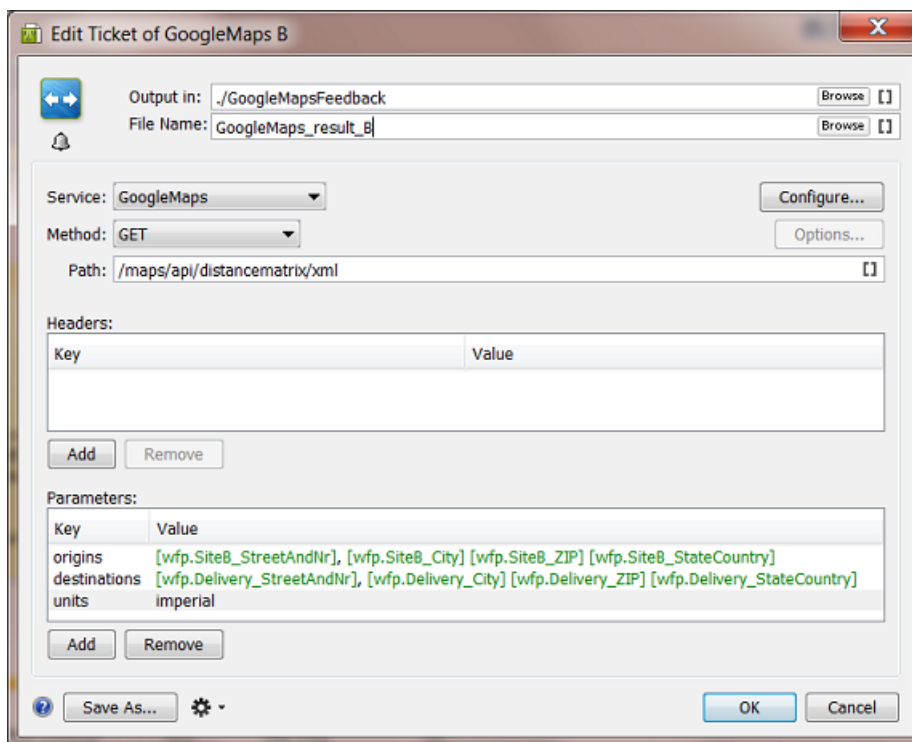
5. Save your workflow.

8.6.5. Step 5 – Define the 2 Interact with Web Service steps

The settings for these 2 steps are almost identical. We will explain the ones for step 'A' and at the end show the differences with those for 'B'.

1. Double-click the step `GoogleMaps A` to open it.

2. Set logical values for the **Output in** and **File Name** fields.
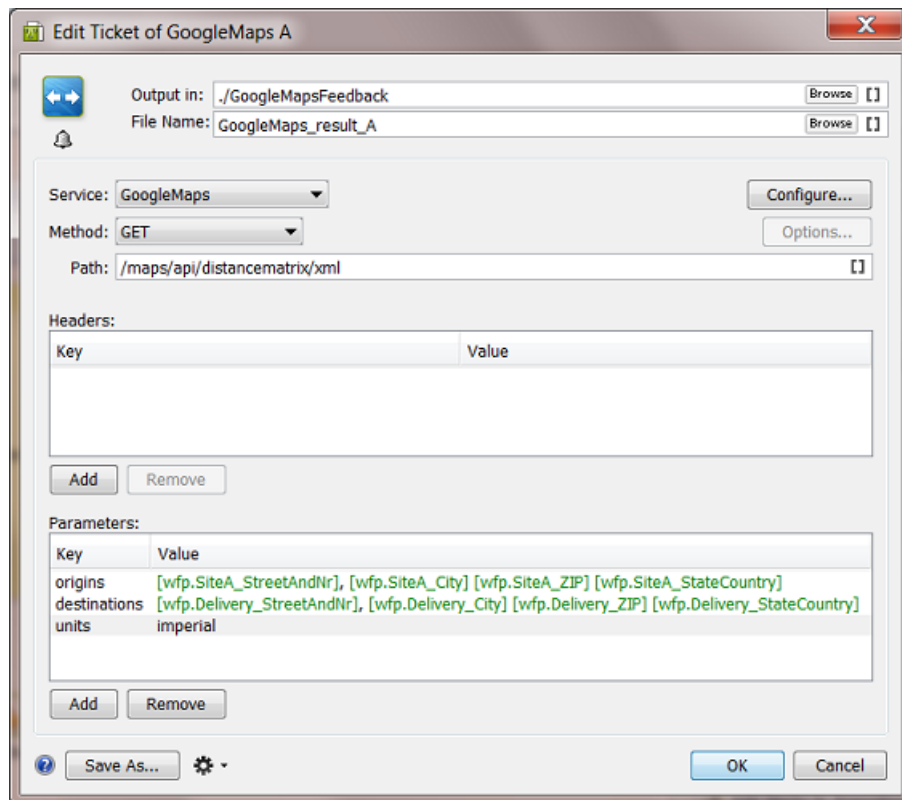
3. Choose the web **Service** you configured for Google Maps and choose the **Method GET**.

4. Enter the **Path** as defined in the API documentation of Google Maps.
Because we are only interested in the distances, we here use Google Map's API `distancematrix` and not the API `directions`.

5. In **Parameters**, use **Workflow parameters** to define the API's key **origins** and **destinations**.
Unlike in Google Map's API `directions`, the keys 'origin' and 'destination' are both in plural here! The comma or space between the parts of the address needs to lead to a valid address specification for Google Maps.

6. The key **units** is optional. The default already is `imperial` (miles, feet, inches ..)

7. Press **OK** to confirm and close this dialog.

8. Now double-click the other step `GoogleMaps B` to open it.

9. Make sure the **File name** of the output XML file is different! And for the key **origins**, use the **Workflow parameters** that match the printing site 'B':

10. Press **OK** to confirm and close this dialog.

11. Save your workflow.

8.6.6. Step 6 – Settings to Collect and Sort the 2 Responses

It is important in this workflow to keep control over the order of the 2 XML files that Google Maps will return us. You do not want to risk mixing up the distances for site A or B.

Settings for the Data Collector step:

Keep the default settings: **Group all collected data**

Settings for the Sort step:

Keep the default settings: **Sort by file name in ascending order**

Save your workflow.

8.6.7. Step 7 – First test to get the Google Maps result files

To define the settings for the **Map Data** step, we need the result XML files from the interactions with Google Maps.

1. In **Pilot**, select the input XML file `RouteCalcRequest.xml` and launch your workflow `EXA – WEB – RouteCalc`. It will probably fail, because we haven't defined the **Map Data** step yet.

2. You should get these 2 files:
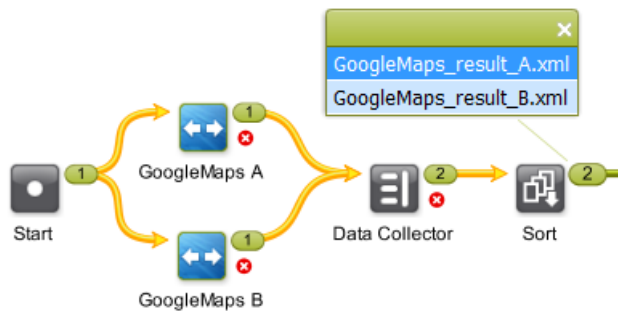
Right-click and choose '**Open** to inspect them.

This is what Google Maps returns us when we ask the distance between site **A** and the delivery site:

```xml
<?xml version="1.0" encoding="UTF-8" ?>
- <DistanceMatrixResponse>
    <status>OK</status>
    <origin_address>2804 Opryland Drive, Nashville, TN 37214, USA</origin_address>
    <destination_address>706 Union Avenue, Memphis, TN 38103, USA</destination_address>
  - <row>
    - <element>
        <status>OK</status>
      - <duration>
          <value>11860</value>
          <text>3 hours 18 mins</text>
        </duration>
      - <distance>
          <value>358003</value>
          <text>222 mi</text>
        </distance>
      </element>
    </row>
  </DistanceMatrixResponse>
```

And this is what Google Maps returns us when asking the distance between site **B** and the delivery site:

```
<?xml version="1.0" encoding="UTF-8" ?>
– <DistanceMatrixResponse>
    <status>OK</status>
    <origin_address>726 Saint Peter Street, New Orleans, LA 70116, USA</origin_address>
    <destination_address>706 Union Avenue, Memphis, TN 38103, USA</destination_address>
  – <row>
    – <element>
        <status>OK</status>
      – <duration>
          <value>20309</value>
          <text>5 hours 38 mins</text>
        </duration>
      – <distance>
          <value>634574</value>
          <text>394 mi</text>
        </distance>
      </element>
    </row>
  </DistanceMatrixResponse>
```

Note: In Google Maps API, the default value unit for time is seconds and the default value unit for distance is meters.

8.6.8. Step 8 – Settings in the Map Data step

Next thing to do in this workflow is merge this information into one XML file.

1. In your workflow (**edit** mode!), open the **Map Data** step.
   You will see that it proposes the workflow's input file (`RouteCalcRequest.xml`) as example input file . This is **not** what we want here!

2. Select the line with that default example **Input File** and double-click to open it. Browse to the first input file we really want as example: `GoogleMaps_result_A.xml`, which we wrote in a subfolder `GoogleMapsFeedback`. Click **OK** to confirm.

3. Click **Add** and browse to the 2nd file we got back from Google Maps and add it as 2nd example **Input File**. Click **OK** to confirm.

4. This also a good time to set a logical folder and file name for this output XML file that we will feed back to the planning system. Let's assume that our output folder is a hot folder of that planning system. Use the **Workflow Parameter** `[wfp.OrderNr]` in the file name.
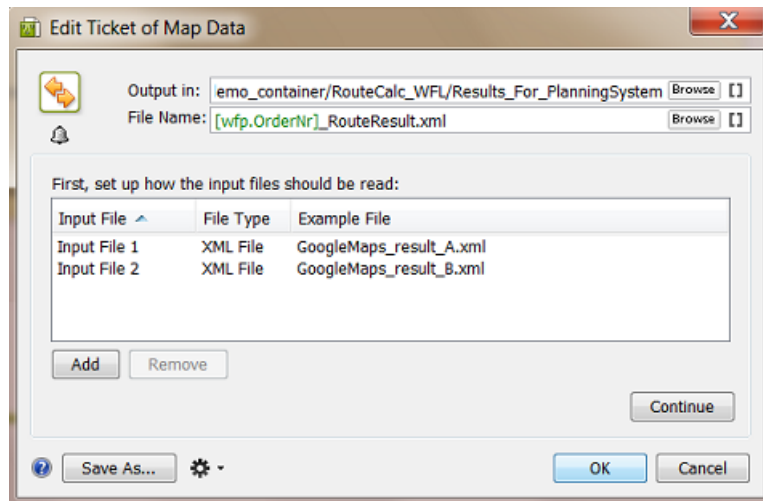
5. Click **Continue** to start defining the XML content that we want to send back.

6. We will first pick up some parameters from the example input files. On the right, in **Parameters**, click **Add**.

7. Click **Edit** to open the **Xpath Builder** and highlight the value of the <text> version of the element <distance> (222 mi).
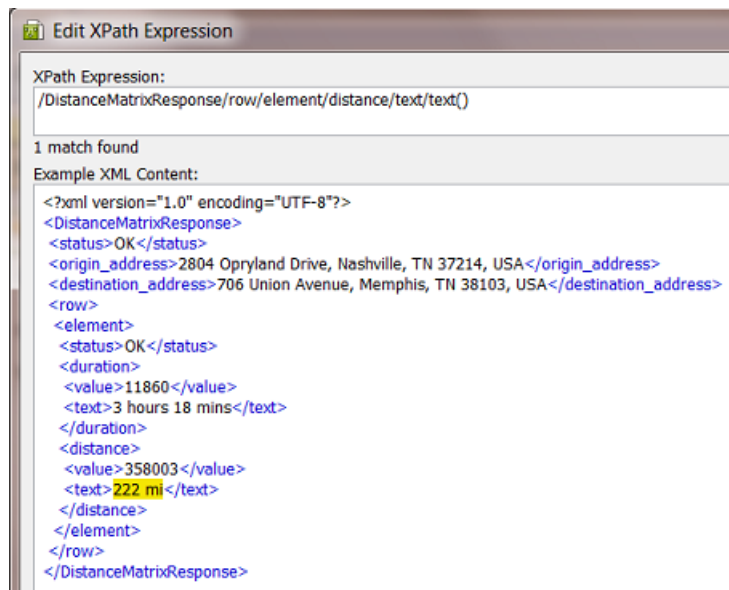
8. Click **OK** to close. In the **Add Parameter** dialog, enter the name 'Distance_From_A' and click **OK** to close.

9. Do the same for the value of the <text> version of the element <duration> (3 hours 18 mins).

10. Then create the same 2 parameters but using the other example input file 'GoogleMaps_result_B.xml' ('394 mi' and '5 hours 38 mins').
You end up with these 4:
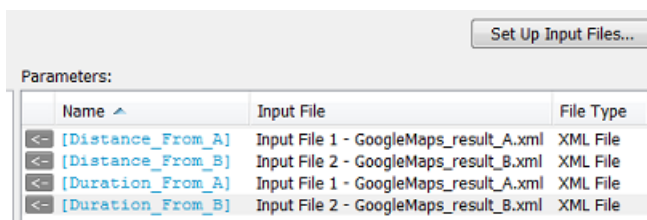
11. Now specify the output XML as shown in below screen shot. See how we use a mix of **Workflow Parameters** and **Parameters** from the example **Input Files**.


12. Click **OK** to close this workflow step.

13. Save your workflow.

8.6.9. Step 9 – Test the complete workflow

Our workflow is now complete (we assume that the place where the **Map Data** step writes the output XML is monitored by the planning system).

1. In **Pilot**, select the input XML file `RouteCalcRequest.xml` and launch your workflow 'EXA – WEB – RouteCalc'.

2. Check the flow and names of the output files. It should look like this:
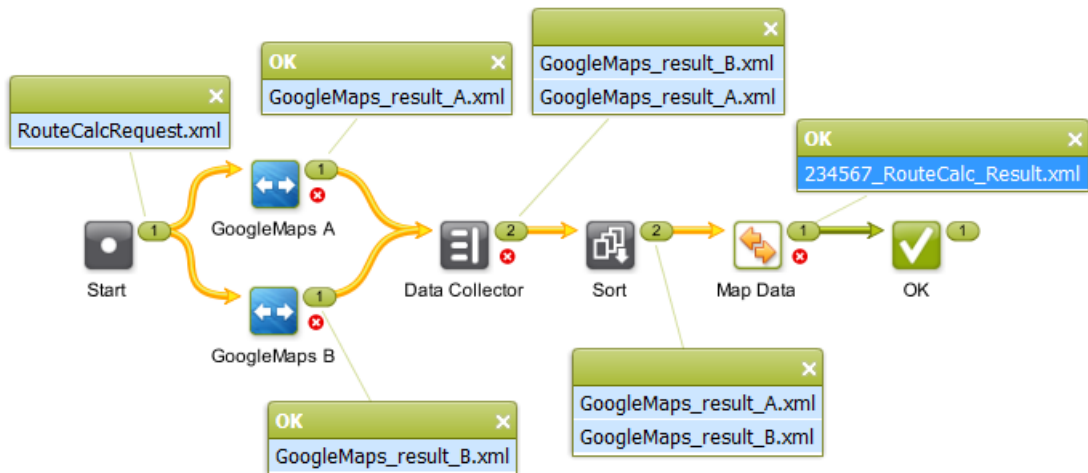
3. Right-click and open the final output file '`2345657_RouteCalc_Result.xml`'. It should look like this:

```xml
<?xml version="1.0" encoding="UTF-8" ?>
<RouteCalcResult>
    <OrderNr>234567</OrderNr>
    <CustomerID>6666</CustomerID>
    <CustomerName>Graceland</CustomerName>
    <Delivery_City>Memphis</Delivery_City>
    <PrintSiteA_City>Nashville</PrintSiteA_City>
    <PrintSiteA_Distance>222 mi</PrintSiteA_Distance>
    <PrintSiteA_Duration>3 hours 18 mins</PrintSiteA_Duration>
    <PrintSiteB_City>New Orleans</PrintSiteB_City>
    <PrintSiteB_Distance>394 mi</PrintSiteB_Distance>
    <PrintSiteB_Duration>5 hours 38 mins</PrintSiteB_Duration>
</RouteCalcResult>
```

The planning system will conclude that, for this job order, the printing site in Nashville is closest.

8.7. Updating a Product Status in an External System via Interact with Database

Summary

Our workflow includes changing the status of a **Product Part** to **Waiting for Approval**. Because this information is important for the service and sales staff, we will also inform the business system of this new status.

Note: In this example, we assume you are familiar with the **Products** tool. Learn more in the dedicated chapter *Products*.

Tools used in this example:

• **Products** tool
• **Manage Product Status** task
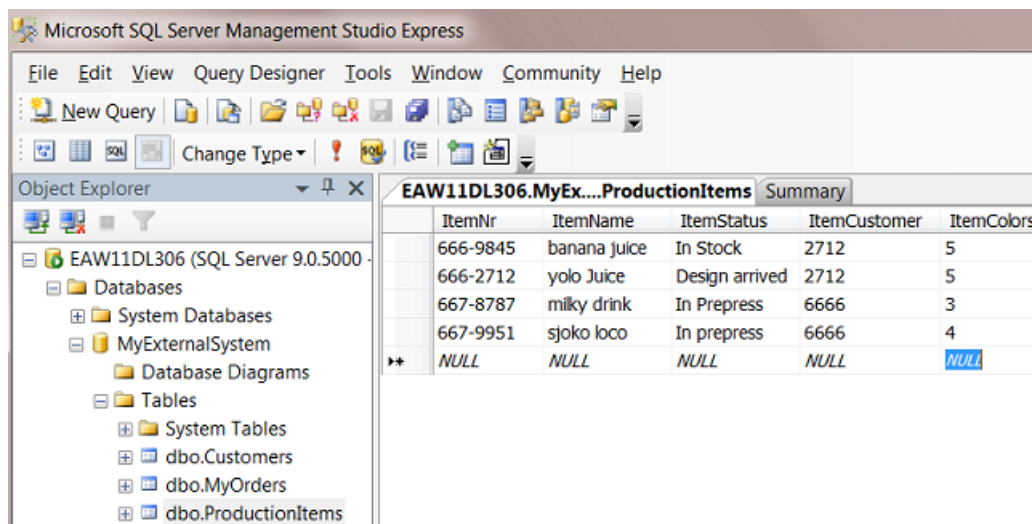• **Interact with Database** task, to an external MS SQL Server

- **Mark File** and **Select Marked File** task
- **ReportMaker** task
- **Send E-mail** task

8.7.1. Step 1 - Analysis and Setup of the External Database

Tip: Click *this link* to find a ZIP with the sample database file used in this example.

Structure of the External Database Table

This is the database we will interact with:

- The database software type is a `MS SQL server`.
- It runs on a a server computer named `EAW11DL306`.
- The name of the database that we will access is `MyExternalSystem`.
- The name of the (opened) table is `ProductionItems`.
- The table contains the description of 4 production items.
- The item `'yolo juice'` shows its `'ItemStatus'` on `'Design arrived'`. That is the database record that we will change in this example.

Configuring the Link to this External Database

Setting up the link to this **External Database** is identical to how we did it for a previous example in *Step 2 - Configure the Link to the External Database* on page 120.

8.7.2. Step 2 - Initial Product Status and Job Setup

This is the starting configuration we need on Automation Engine:

- In **Pilot** > **Products** > **Manage Product Statuses**, create a **Status** '**Design arrived**' with a blue color and create a status '**Waiting For Approval**' with a yellow color.

- Create a **Product** 666-2712. Give it the status '`Design arrived`' and link it to the **Job** 1237.
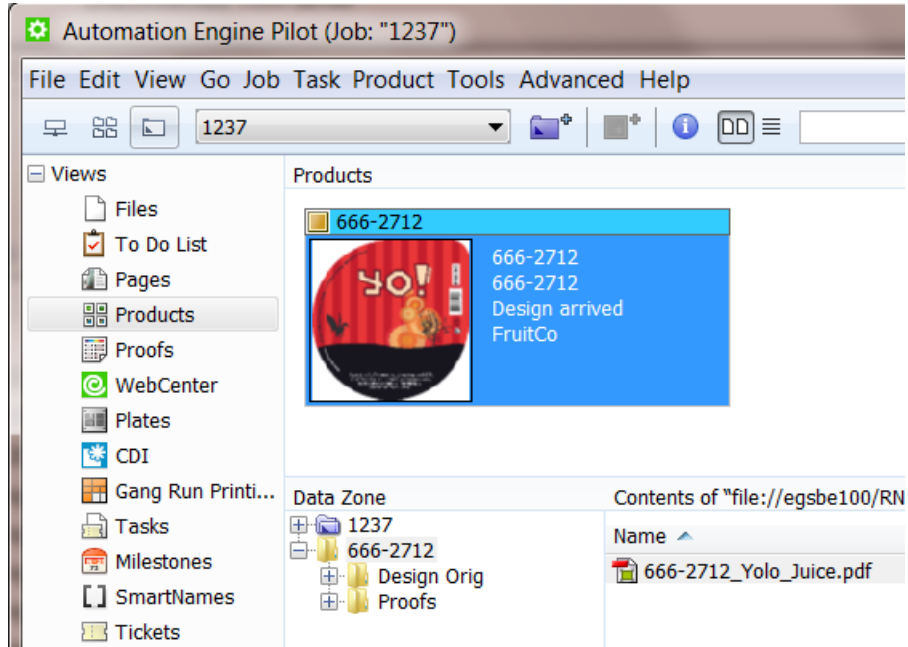
- The **Job** 1237 is for customer `FruitCo`.
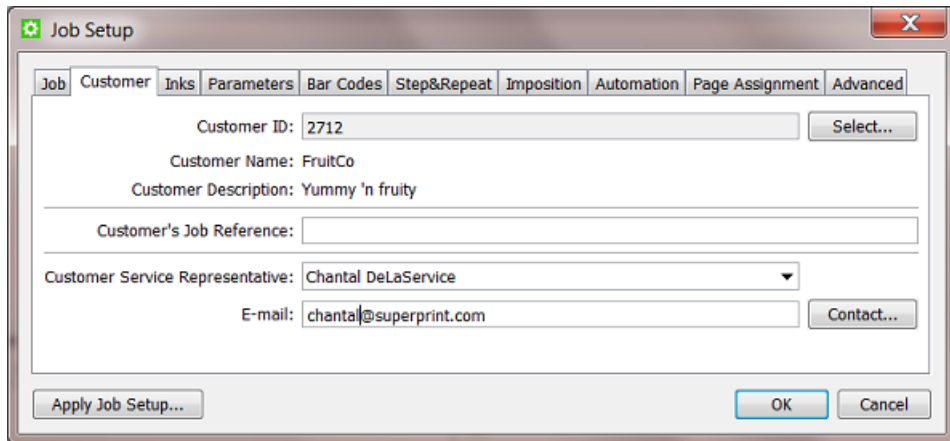
8.7.3. Step 3 – Create the Workflow

In our example, we assume that the design was already preflighted and made ready for print. Our workflow starts by creating a proof report and e-mailing it to the customer. It then changes the **Product** status to **Waiting For Approval** and also updates the external database of this new status.

1. Create this workflow and save it as '`EXA - PRODSTAT`':

2. In the **Mark File** step, set the **tag** 'Product file'.

3. In the **Create Report** step, we advise these logical settings:

    • choose any **Report Template**

    • choose to **Export** to an extra PDF (we will e-mail the report PDF so you do not want the PDF to refer to external files!)

    • choose a to **Output** the file somewhere in the **Job Folder** (because the report will probably contain Job specific info)

    • choose a logical **File Name** which will make sense to the customer when he receives it via e-mail.
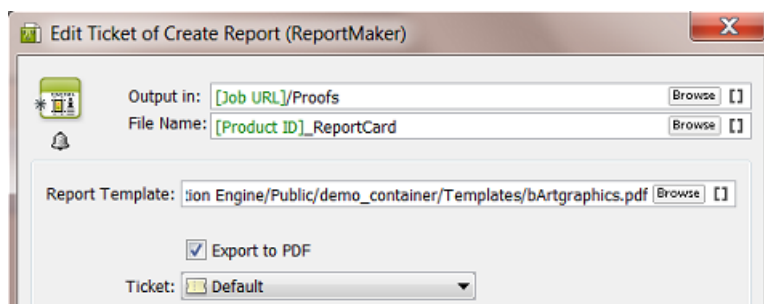
4. In the **Send E-mail** step, we advise these logical settings:
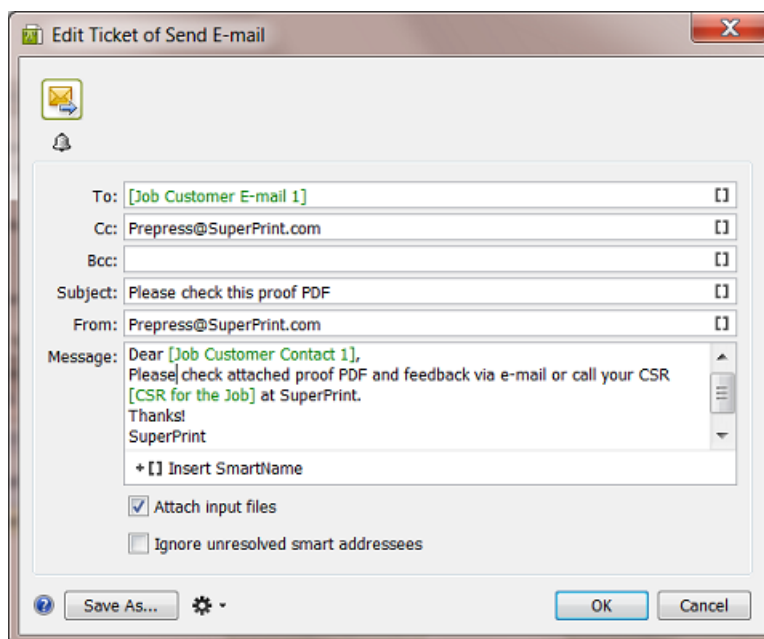
5. In the **Select Mark File** step, use '`Product file`' as the tag to be selected.
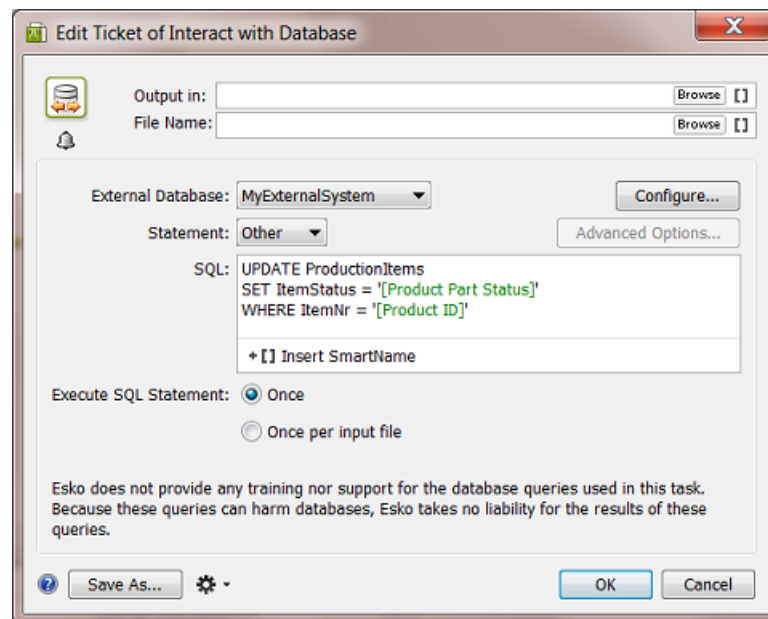6. In the **Manage Product Status** step, select the **Status** '**Waiting For Approval**'.
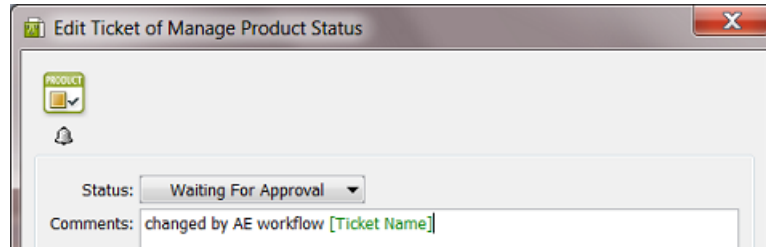
7. Save your workflow.

   The **Interact with Database** step is described in the next step of this example.

8.7.4. Step 4 – Setup of the Interact with Database Step

These are settings we need:

- **Output in** and **File Name**: because we are changing an existing database record, the type of **SQL** statement in this example is '`UPDATE`'. As mentioned in *the documentation of this task*, this task only outputs an XML file for '`SELECT`' statements.

- **External Database**: select the one you set up for the database in this example.

- **Statement**: use **Other**.

- **SQL**: use the query as shown in the screen shot. The 2 **SmartNames** make this query work for all **Product (Parts)**.
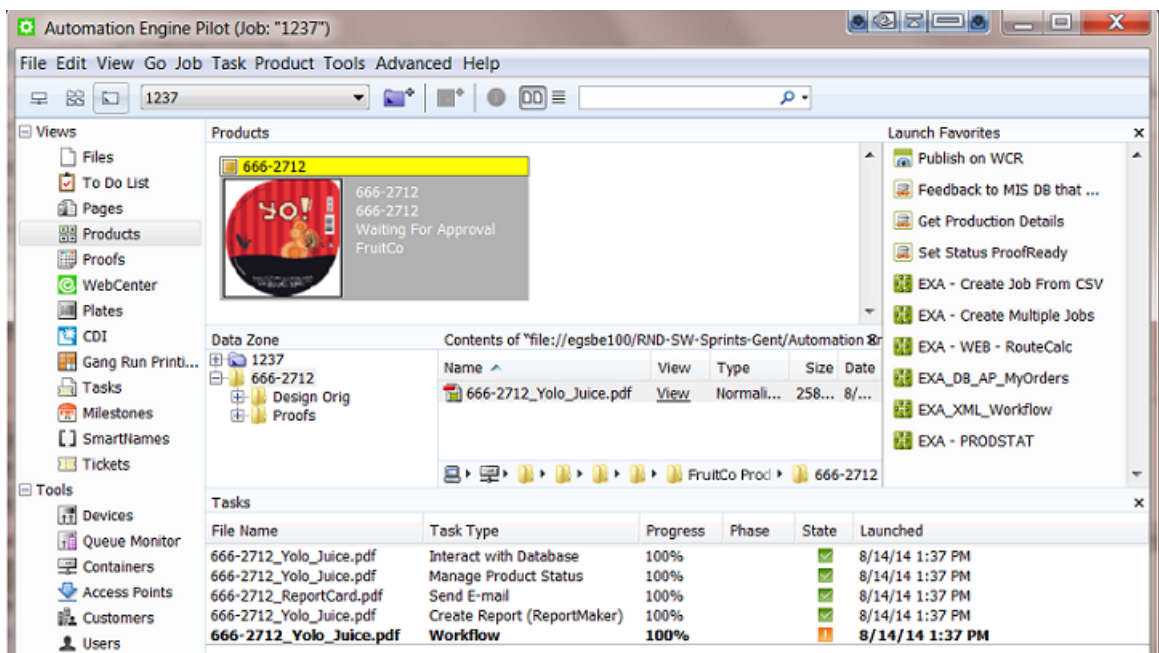
- Click **OK** to close.
- Save your workflow.

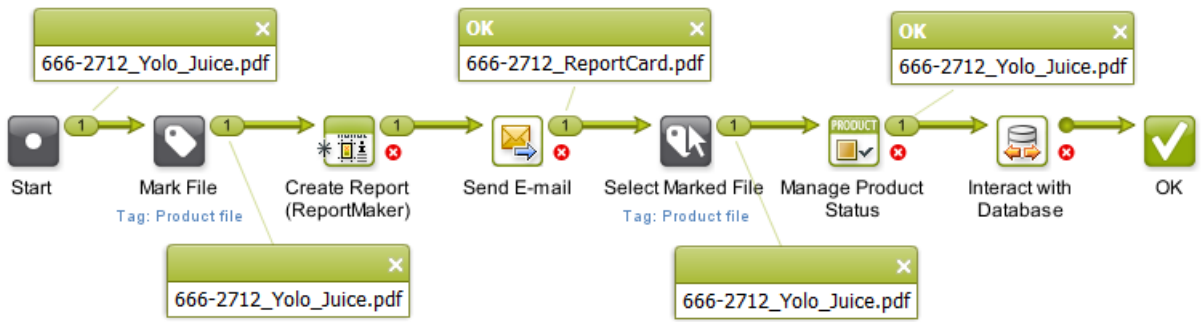### 8.7.5. Step 5 - Test the Workflow

1. In **Pilot**, open the **Job** '1237'.
2. In **Products View**, select the linked in **Product** '666-2712'.
3. Launch the workflow 'EXA - PRODSTAT' that you created (using a **Favorite** or right-click **Launch with** or...).
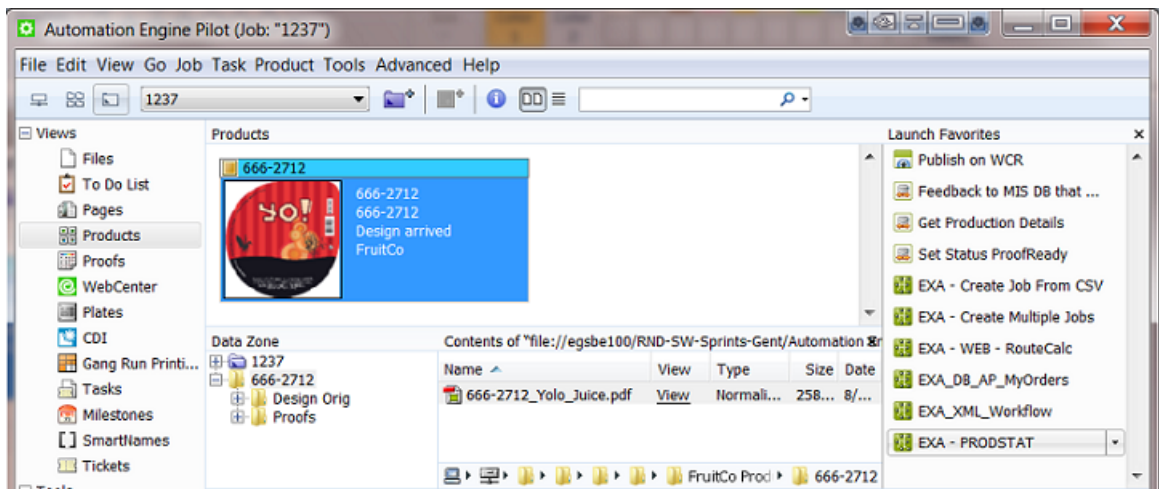
4. This is the result in the Pilot ; notice the Product's change in status and color:

5. This is the resulting finished workflow:

6. This is how the external database should have changed ; notice the new status `Waiting For Approval` for item `666-2712`:

ItemNr	ItemName	ItemStatus	ItemCusto...	ItemColors
666-9845	banana juice	In Stock	2712	5
666-2712	yolo Juice	Waiting For Approval	2712	5
667-8787	milky drink	In Prepress	6666	3
667-9951	sjoko loco	In prepress	6666	4

EAW11DL306.MyEx....ProductionItems / Summary