enfocus SWITCH 2018

Reference Guide

enfocus

Contents

1. What's new? 5
1.1. New in Switch 2018 5
1.2. New in Switch 2018 update 1 6
1.3. New in Switch 2018 update 2 6
1.4. New in Switch 2018 update 3 7

2. Understanding Switch 8
2.1. About Enfocus Switch 8
2.2. Switch application components 10
2.3. Getting started 11

3. Installing, activating and starting Switch 12
3.1. Before you start the installation 12
3.2. Installing Switch 13
3.2.1. Disabling UAC (Windows only) 14
3.3. Activating Switch 15
3.3.1. Activating Switch (online method) 15
3.3.2. Activating Switch (offline method) 16
3.4. Managing your Switch licenses 18
3.4.1. About the Switch licenses 18
3.4.2. Checking the status of your Switch licenses 20
3.4.3. Activating a Switch trial for additional modules (online method) 20
3.4.4. Activating a Switch trial for additional modules (offline method) 21
3.4.5. Activating additional Switch modules (online method) 22
3.4.6. Activating additional Switch modules (offline method) 23
3.4.7. Deactivating Switch modules (online method) 24
3.4.8. Deactivating Switch modules (offline method) 25
3.4.9. Repairing Switch (online method) 26
3.4.10. Repairing Switch (offline method) 27
3.4.11. Upgrading to a new version of Switch 28
3.5. Starting Switch 29
3.6. Starting/restarting Switch Server 31
3.7. Troubleshooting 31

4. Configuring Switch 33
4.1. Configuring Switch user preferences 33
4.1.1. Setting your Switch preferences 34
4.1.2. Switch preferences: User interface 34
4.1.3. Switch preferences: Mail send 36
4.1.4. Switch preferences: FTP proxy 37

4.1.5. Switch preferences: HTTP proxy ... 38
4.1.6. Switch preferences: Mac file types ... 39
4.1.7. Switch preferences: Processing ... 41
4.1.8. Switch preferences: Error handling ... 43
4.1.9. Switch preferences: Problem alerts ... 45
4.1.10. Switch preferences: Application data ... 45
4.1.11. Switch preferences: Logging ... 47
4.1.12. Switch preferences: Flows backup ... 48
4.1.13. Switch preferences: Internal communication ... 49
4.1.14. Switch preferences: ODBC data sources ... 50
4.1.15. Switch preferences: Remount volumes ... 53
4.1.16. Switch preferences: Active Directory settings ... 55
4.1.17. Switch preferences: Web services ... 56
4.1.18. Switch preferences: Reporting ... 57
4.1.19. Switch preferences: Webhooks ... 58
4.2. Configuring Switch users ... 59
4.2.1. Setting up Switch users ... 59
4.2.2. Assigning access rights ... 66
4.3. Running Switch Watchdog as a service ... 67
4.3.1. Switch Server and Switch Watchdog ... 67
4.3.2. Setting up Switch Watchdog as a Windows service ... 67
4.3.3. Operating Switch as a Windows service ... 68
4.3.4. Switch service and mapped drives ... 68
4.3.5. Switch Service not compatible with (configurators for) desktop applications ... 69
4.4. Setting up custom icons for job boards ... 69

5. Working with Switch ... 71
5.1. Switch Graphical User Interface ... 71
5.1.1. Workspace overview ... 71
5.1.2. Flow elements: overview ... 92
5.2. Working with flows ... 213
5.2.1. About working with flows in Switch ... 213
5.2.2. Creating a new blank flow ... 213
5.2.3. Creating a new flow based on a sample flow ... 214
5.2.4. Designing flows ... 214
5.2.5. Managing flows ... 262
5.2.6. Monitoring flows ... 278
5.2.7. Handling execution problems ... 293
5.2.8. Advanced topics for running flows ... 296
5.3. Working with apps in Switch ... 299
5.3.1. About the Switch apps - an introduction ... 299
5.3.2. About the Enfocus Appstore ... 301
5.3.3. Finding apps ... 302
5.3.4. Trying an app for free ... 303

5.3.5. Purchasing an app....304
5.3.6. Installing a new version of an app....305
5.3.7. Assigning an unassigned app....306
5.3.8. Uninstalling an app....306
5.3.9. Assigning an app to a different Switch installation....307
5.3.10. Adding a Switch manager....307
5.4. Using the Switch Web Portal....308
5.4.1. Signing in to the Switch Web Portal....308
5.4.2. Changing the language of the Switch Web Portal....309
5.4.3. Viewing log messages through the Switch Web Portal....309
5.4.4. Finding Switch jobs through the Switch Web Portal....316
5.4.5. Managing dashboards on the Switch Web Portal....320
5.4.6. Submitting and checking jobs through the Switch Web Portal....334
5.5. Working with the additional Switch modules....356
5.5.1. Feature matrix....356
5.5.2. Configurator Module....358
5.5.3. Metadata Module....382
5.5.4. Scripting Module....448
5.5.5. Database Module....448
5.5.6. SwitchClient Module....459
5.5.7. Switch Web Services....459
5.5.8. Reporting Module....460
5.6. Stopping the Switch Server....460
5.7. Quitting Switch....460

6. The Switch Insight Dashboard....461
6.1. Enabling your Switch Insight Dashboard....461
6.2. Consulting your Switch Insight Dashboard....462

7. Advanced topics....463
7.1. Switch performance tuning....463
7.2. Data Collecting Wizard....465
7.2.1. Collecting application data....466

8. Need more help?....468

9. Copyrights....470

10. Third-Party License Information....471

1. What's new?

1.1. New in Switch 2018

Switch 2018 includes the following new features:

Job finder

Information about the jobs that are being processed by the Switch Server is now available at a glance thanks to the new Switch Job finder. This is a new view on the Switch Web Portal, where you can create your own virtual job boards. You can set up several boards and for each board determine which jobs (based on flow and/or flow stage) you want to see. Access rights are set in the Users pane.

For more information, refer to *Finding Switch jobs through the Switch Web Portal* on page 316

Switch Job Client

To save time, SwitchClient users can now process multiple jobs in one go if these jobs are in one and the same Checkpoint. Refer to *Processing multiple jobs as one* on page 353.

There is now also a search box in the Check jobs view, allowing you to find your jobs much faster than before.

We also developed a new tool, "Switch Helper", that, once installed on your computer, allows you to edit jobs in a Checkpoint, without having to download them locally. Refer to *Review options* on page 354.

Installation process

From this version onwards, it's no longer obligatory to install all Switch components (Switch Server, Designer, the Core Engine, etc) on the systems that run Remote Designer. You can simply clear the Switch Services option in the installation wizard. For more information, refer to *Installing Switch* on page 13.

Changes in the Switch scripting API

Some examples:

- A number of new calls are now available, for example removeGlobalData and getCounter.
- There's now support for JSON and webhooks (webhookTriggered entry point, the webhookRequest class), etc.
- The 'persistent' execution mode is no longer supported.

For more information, refer to the Switch Scripting Guide.

Other changes

- A new flow element (*Webhook*) has been developed to allow external applications to send notifications over HTTP(S) to Switch. This requires some configuration in the Switch Preferences: see *Switch preferences: Webhooks* on page 58.

- It's now possible to establish a secure connection to the Active Directory Server. To do so, make sure to select the **Secure connection** checkbox in the Active Directory Settings dialog. See *Switch preferences: Active Directory settings* on page 55.

- Folders have got an extra (optional) property: **Flow stage**. Thanks to this property, it's easy to see on the Job finder boards on the Switch Web Portal in which stage your jobs currently are. See *Folder* on page 97 and *Working with flow stages* on page 103.

- From this version onwards, you have immediate access to metadata thanks to the **Inspect jobs** button in the toolbar or the **Flow** > **Inspect jobs** menu option. You can immediately check the value of a particular variable for a particular sample job. See *Working with sample jobs* on page 390.

- Another small improvement, handy when working with sample jobs: the context menu in the canvas has a new option to release all 'on hold' connections in one go. See *Releasing a connection* on page 281.

- It's now possible to bypass the HTTP proxy settings for particular servers as required. See *Switch preferences: HTTP proxy* on page 38.

1.2. New in Switch 2018 update 1

Switch 2018 update 1 brings one major new feature: the ability to create your own dashboards on the Switch Portal.

Reporting Module

The new functionality is part of a new Switch module, the Reporting Module, which requires a license key and needs to be activated just like the other Switch modules.

Dashboards

You can now create your own dashboards based on the information gathered on the job boards (formerly known as Job finder boards). Switch provides several widgets (a live graph, a counter, a history graph), that you can use to visualize the number of jobs, for example the number of jobs per stage, state or flow, the number of problem jobs etc.

Refer to *Managing dashboards on the Switch Web Portal* on page 320.

Changes on the Portal

With the introduction of the Reporting Module, the 'Job finder' view is replaced by a new view called 'Boards'. A new button **+ Manage** opens a dialog that allows you to manage the two types of boards: the job boards introduced in version 2018 and the dashboards introduced in this release (but only available if you have licensed the Reporting Module). Access rights (for both types of boards) remain configurable via the Users pane.

1.3. New in Switch 2018 update 2

Switch 2018 update 2 brings two major new features: board sharing on the Switch Web Portal and the new Switch Insight Dashboard.

Sharing boards on the Switch Web Portal

From this version onwards, job boards and dashboards can be shared among users of the same user group. Additionally, users in the administrator group can share boards with all available groups. Permissions with regard to the boards (full access, read-only, no access) can be set on user and user group level. Refer to *Configuring a user* on page 60, *Managing a dashboard* on page 325 and *Managing a job board* on page 318.

The Switch Insight Dashboard

This is a new and free dashboard for maintenance users, accessible from within Switch (a new option in the menu bar) or via the account section on the Enfocus website ("My dashboards"). This dashboard provides you with weekly statistics about the jobs that are processed by your Switch Server. You can for example see how many jobs were processed, how many failed, what are the peaks in production etc.

Note that the Insight Dashboard is visible to all Switch managers (formerly called "app" managers). For more information, refer to *The Switch Insight Dashboard* on page 461.

Other changes

- From this version onwards, it's possible to upload a custom image and use it as a flow marker. See *Setting flow markers* on page 265.
- *Mail send* and *Checkpoint via mail* now allow you to specify a different sender than the one mentioned in the Switch preferences.
- *Problem jobs* can now be configured to send alerts to other users than the one(s) mentioned in the Switch preferences. As a consequence, you can set up flow-based alerts.
- Assemble jobs has a new option: in case of duplicates it is possible to discard the new version of the file.
- It is now possible to add stages to end folders of a flow.
- Webhook (both the element and the scripting entry point) has been improved: the delay between receiving and processing a notification has been decreased. While in Switch 2018 update 1 the delay could be up to 10 seconds, Switch 2018 update 2 processes the request in an average of less than 1 second.
- You can now determine via the *Preferences* how ongoing FTP transfers should be handled when stopping a flow: abort them or wait until they are finished.
- Small improvements have been made to enhance the Web Portal, for example:
  - The *history graph* and the *live graph* have got a zoom function (via the mouse wheel) and a new option to show gridlines.
  - The *history graph* can now have the form of a pie (in addition to a line, spline or bar) and stages that are not selected on the job boards are no longer shown.
  - *Job boards* have got an extra filter option: Include jobs finished in the last x hours. The entered value will determine how long the finished jobs stay on the job board.
  - The Submit point view in the Switch Web Portal now offers a search box with instant results.

1.4. New in Switch 2018 update 3

Switch 2018 update 3 fixes a number of issues related to the log messages, the Execute command tool and the Web Services. This does not affect the documentation.

2. Understanding Switch

2.1. About Enfocus Switch

Enfocus Switch is a **modular software solution** that allows you to **automate tasks**, such as receiving files or folders, sorting them and routing them to a particular process or folder.

Modules

Switch consists of different modules:

- A core engine module, which offers the basic functionalities, and
- A number of additional modules that you can purchase if you need more advanced functionality.

The table below gives an overview of the different modules.

Module	Description
Switch Core Engine	• Provides the basic functionality for receiving, sorting, routing and tracking of files. • Enables PDF-specific handling like splitting and merging of PDF files.
Configurator Module	• Allows you to use a number of third-party applications in a Switch flow, such as the Adobe Creative Suite and other applications that are often used in the graphical industry. For a list of all supported applications, refer to the *Configurator Module documentation*. • For each of the supported applications, Switch offers a configurator which streamlines the connection between Switch and the application concerned, and controls the output destination of the processed files. **Note:** All supported configurators are available by default, but you must have an active license for the third-party application to be able to use the configurator. For example, you can only use Adobe InDesign in a Switch flow if you have an active license for Adobe InDesign.

Database Module	• Automates the communication between databases and Switch, without the need for additional scripting.
	• If you have purchased the Database Module, the **Database connect** flow element becomes available and allows you to integrate a database into your Switch flow, i.e.:
	  • Use values from a database.
	  • Read, write, update and delete information in a database.
	  • View database values through the Switch Web Portal.

Module	Description

Metadata Module	• Allows you to use metadata information stored in XML or JDF tickets, stored as XMP data, or stored as a dataset in some custom file format (opaque dataset).
	• If you have purchased the Metadata Module, the **Metadata flow elements** become available, allowing you to:
	  • Use metadata wherever Switch uses variables, for example to route files or process jobs dynamically.
	  • Update or add information in XMP packages.

Scripting Module	• Allows you to use scripts and script expressions in Switch. • Scripts can be developed with SwitchScripter, a Switch application component that comes with the Switch core engine. You don't need an active license for the Scripting Module to develop scripts; however, to use them in Switch (using the Script element), you do need such a license. • If you want to write scripts for the integration of third-party applications in Switch, you also need to buy the Configurator SDK. Contact Enfocus for more information.

SwitchClient Module	• Allows you to access the Switch Server remotely. You can:
	  • Submit jobs to Switch flows (via Submit points)
	  • Review and route jobs (via Checkpoints)
	• You can either use this functionality through the Switch Web Portal, or through your own custom job client.
	• The SwitchClient Module comes with 5 concurrent user licenses, meaning that 5 users can access Switch through a web interface *at the same time*. Additional client licenses can be purchased if necessary.

Switch Web Services Module	• Allows you to design custom Switch client interfaces with existing applications or web-based interfaces. For example, you could build an interface to allow your customers to submit files straight from your company website. • The API is well-documented and can be found on *the Enfocus website*.
Performance Module	• The Performance Module offers additional processing capabilities, i.e. an *unlimited* number of concurrent processes as well as advanced performance tuning. **Note:** The Switch Core Engine allows up to 4 concurrent processes; you can also buy a specific license key for additional concurrent processes. For more information, please contact your local Enfocus reseller or sales@enfocus.com.
Reporting Module	• The Reporting Module allows you to create and display dashboards on the Switch Web Portal. You can configure the data you want to

Module	Description
	use (by defining job boards) and choose from different widgets to display live data or historical data (to get statistics).

Note: When you install Switch, all modules are installed by default, but you have only access to those for which you have entered a license key.

2.2. Switch application components

Switch consists of 5 applications components that are all installed at once when running the Switch installer.

Switch Server

The Switch Server is the core engine of Switch. It runs in the background to execute all processes and does not have its own interface.

Switch Server is started and terminated by the Switch Watchdog, an application designed to monitor Switch Server. The Switch Watchdog doesn't have an interface either and is started and terminated by the Designer, unless the *Switch Watchdog is set up as a Windows service*. In that case, the Switch Server is started automatically when a user logs in, and Switch can continue processing even if the Switch Designer is closed.

Switch Designer

The Switch Designer is the Switch user interface. It allows you to design, activate, and monitor Switch workflows. The Designer communicates with and manages the Switch Server.

The Designer and the Server can run on the same computer to establish a one-on-one communication, but this is not mandatory.

If you install Switch on multiple computers, you can launch the Designer from another computer and manage the flows remotely. In that case, do not forget to define which users have the right to connect to a given Switch Server by means of the Remote Designer (See *Setting up Switch users* on page 59).

For a detailed overview, refer to the chapter about the *Switch graphical user interface*.

Switch Web Portal

The Switch Web Portal allows you to connect to the Switch Server through a web browser interface, for example to view log messages and active jobs or to submit and check jobs without having to use a Switch Designer. You can also create job boards to keep an eye on your production and dashboards with counters and different kinds of graphs.

Note that submitting and checking jobs through the Web Portal requires a SwitchClient license; creating dashboards requires a license for the Reporting Module.

Access rights for individual users or user groups can be set through the Users pane.

For more information, refer to *Using the Switch Web Portal* on page 308.

Switch Web Services

The Switch Web Services take care of all data communication between Switch and its client applications such as the Switch Web Portal, our customers' own clients etc. It's part of the default Switch installation.

SwitchScripter

SwitchScripter offers a scripting development environment, that is, it allows creating and testing script packages for use with Switch.

The Switch installer automatically installs SwitchScripter. Although there is no technical requirement, SwitchScripter usually runs on the same computer as the Designer.

For more information, see *Scripting Module* on page 448.

2.3. Getting started

Switch Quick Start Guide

If you are new to Switch, we recommend reading the Switch Quick Start Guide.

This Guide explains the basic concepts of Switch and helps you to create and design your first flows. It also contains a number of exercises: you can try to make them yourself, and afterwards check the sample solution or watch a video about the topic concerned.

The Switch Quick Start Guide is available on the *Manuals section of the Enfocus website*.

Training

You can also take an eLearning course (with interactive exercises), or watch a product movie or a recorded webinar.

All training material can be found on the *Learn section of the Enfocus website*. Make sure to select "Switch" and "Beginner".

A good start are the "Getting Started with Switch" eLearning modules:

- **Module 1**: Installation, activation and configuration
- **Module 2**: Creating your first flow
- **Module 3**: Exercise
- **Module 4**: Metadata
- **Module 5**: Working with folders and subfolders

3. Installing, activating and starting Switch

This section contains all you need to know about installing, activating and starting Switch.

3.1. Before you start the installation

General setup

Before you can use Switch, you must:

1. *Install the application*, by running the Switch Installer. The Switch Installer installs Switch Designer and the other Switch components (Switch Server) with all the different Switch modules (Core Engine, Configurator Module, Database Module ...).
2. *Activate the modules* you have purchased, by entering a valid license key.

Note: Afterwards, you can still activate additional Switch modules.

Local Designer versus Remote Designer

If you install and activate Switch on **one system**, this one system will be used to configure Switch flows (with Switch Designer) and to run processes (with Switch Server).

However, if you want to be able to access Switch Server remotely, i.e. if you want to configure flows and administer Switch on another computer than the one that is running the processes, you must install the Switch Designer **on all systems (MAC and/or PC) you want to use with Switch**. In that case, some additional steps are required (see below).

Note: Make sure to use the same Switch version on all systems.

Setup for Remote Designer

To set up Switch for Remote Designer, proceed as follows:

1. Set up Switch **on the system that will be used to run the processes** (see general setup).
2. On this system, *configure the users and/or users groups* that will have the right to use Remote Designer.
3. *Install the same version of Switch* **on all systems** where you are going to use the Remote Designer. Note that during the installation, you can clear the Switch Services and the Dashboard Services checkbox, as they are not needed on these systems; only the Designer needs to be installed.
4. You do not have to activate any licenses, as they will be checked automatically in the background.

When starting Switch, you will be asked if you want to connect to a local or a remote Switch Server.

See also *Starting Switch* on page 29.

System requirements

Before installing Switch, make sure to check the *system requirements* on the Enfocus website.

Installation order for Switch and third-party applications/PitStop Server

If you are going to use Switch with a third-party application or PitStop Server (using a configurator), we recommend installing this application first, before installing Switch. That way, Switch can automatically find the third-party application. This is necessary for the configurator to run.

If the third-party application/PitStop Server is installed afterwards while Switch is running, make sure to restart Switch.

For more information, refer to *About the Configurator Module* on page 358 and *About the configurators* on page 360.

Some tips to optimize the performance of Switch

Use multiple processors

As Switch is a multi-threaded application, it takes full advantage of multiple processor systems. Also, if you're working with third-party applications, they too will require processing time (cycles). More processors can help improve the overall performance.

The number of concurrent processing tasks is however limited by default in Switch Core Engine (see the preference 'Concurrent processing tasks'). If you have a multi-core powerful system, you may want to buy additional concurrent processes licenses or even the Performance module to have an unlimited number of concurrent tasks.

Ensure sufficient disk space and speed

Switch will be managing many files in and out of the Switch workflow. As well, 3rd-party applications will need to open and work with files on the local Switch Server. To increase performance of the system, selecting faster access (read/write) disk drives will help speed up the performance of each application. Also ensure to allow for enough disk space to accommodate your highest possible workload.

Provide sufficent system memory (RAM)

Although Switch is not RAM intensive, be sure to take into account third-party application requirements as well. In general, the more RAM available, the better and it will help improve the overall system performance.

Make sure to meet all network requirements

Given Switch will work with files from all over your network as well may be receiving or sending information or jobs to other systems within your workflow, be sure the Switch Server can easily access to all your shared systems.

3.2. Installing Switch

Prerequisites: You must have administrator rights on your local computer to install Switch.

Note:

- If you want to use Remote Designer, you must install Switch on all systems that you will use with Switch. For more information about the difference between a local and a Remote Designer, refer to *Before you start the installation* on page 12.

- If you want to install a more recent version of Switch, refer to *Upgrading to a new version of Switch* on page 28.

To install Switch

1. Do one of the following:
   - Insert the Enfocus Product CD-ROM or DVD into your CD-ROM/DVD-ROM drive.
   - Use the link you received from your local reseller to download Switch.

   Switch is only sold via local resellers. Different from other Enfocus products, you cannot download it directly from the Enfocus website.
2. If necessary, double-click the Switch installer.
3. Follow the onscreen installation instructions.

   Important: It's important to pay attention to all messages shown during the installation.

   At some point Windows users will be asked to disable UAC. For more information, refer to *Disabling UAC (Windows only)* on page 14
4. During step 5, 'Installation Type', clear the components you don't need.
   - **Switch Service**: This component installs the Switch Server. If enabled, the other two components (the Designer and the Dashboard Service) are installed as well. This is the default setup. *Only **clear** this checkbox if you want to use the system concerned to...*
     - Run a Remote Designer (select the **Designer** checkbox) and/or
     - Install the Dashboard Service remotely, on a different server than the Switch Server (select the **Dashboard Service** checkbox). In that case, do not forget to configure the *Reporting preference*. After installation, the Dashboard Service is started automatically.
   - **Designer**: This component installs the Switch Designer.
   - **Dashboard Service**: This component installs the service that is needed to create job boards and dashboards on the Switch Portal. Refer to *Finding Switch jobs through the Switch Web Portal* on page 316

Once you have finished the installation, the Switch Services and the Dashboard Service are started automatically. Remember that you still have to activate your Switch license(s) before you can start using Switch.

3.2.1. Disabling UAC (Windows only)

User Account Control (UAC) is a security feature in Windows. It allows you to determine whether or not you want to be notified if changes that require administrator permission are made to your system.

During the installation of Switch, you are asked to disable UAC. If you don't, you will not be able to install Switch, nor will you be able to work with it. You must leave UAC disabled, also after you have finished the installation.

Note: This warning may pop up even if you have already disabled UAC. In that case, just ignore the warning and click **Next** to proceed.

To disable UAC

1. Open the User Account Control Settings panel.

   If you don't know where to find it, open the Windows start screen and search for 'User Account Control'.

2. Drag the slider to the bottom, to the option **Never notify**.

3. Click **OK**.

4. Restart the computer.

3.3. Activating Switch

Once you have installed Switch, you must activate the application.

Trial version

If you want to try the application before you buy it, you can activate a **trial version**. A trial version remains active for 30 days.

The Switch Core Engine doesn't have a **built-in** trial version; contact your local Enfocus reseller and request a trial version. You will receive a license key which can be activated in the same way as a purchased license (see further).

The Switch additional modules do have a built-in trial version. Once you have activated the Switch Core Engine, you can activate trial versions of the other modules, without having to contact a reseller. Refer to *Activating a Switch trial for additional modules (online method)* on page 20 or *Activating a Switch trial for additional modules (offline method)* on page 21.

Licensed version

If you have bought the application, you can **activate the modules for which you have a license**:

- If you installed Switch on a computer *with internet access*, refer to *Activating Switch (online method)* on page 15.

- If you installed Switch on a computer *without internet access*, refer to *Activating Switch (offline method)* on page 16.

  Note: In this case, you need another computer with internet access to communicate with the Enfocus web server.

Remember that you can only activate licenses with a local Designer. When using Remote Designer, you can view the license information, but you cannot change it.

3.3.1. Activating Switch (online method)

Once you have installed Switch, you must activate the modules for which you have a license.

Note:

- You need at least a license for the Switch Core Engine. Other modules are optional.
- If you're using a firewall, make sure to allow Switch to communicate with *https://licensingservices.esko.com* using ports 80 and 443.

This procedure describes how to activate Switch *on a computer with internet access*.

To activate Switch

1. Start Switch and connect to the local Switch Server.

   Activation is only possible on a local Switch Server.

   The **About Enfocus Switch** dialog appears.

2. Enter your Enfocus ID and password.

   If you don't have an Enfocus ID yet, click the **Create Enfocus ID** link and enter the required information. Your account is created immediately, so you can proceed with the activation procedure.

   Note: If your system environment requires HTTP connections to pass through a proxy server, Switch will ask you to enter the details of your proxy server. Note that, to be able to use external services with Switch, you will also have to turn on *the HTTP proxy user preferences*.

3. Click **Sign In**.
   A dialog pops up. Here you should enter your product key(s) or your product key license file.

4. To supply your product key(s), do one of the following:

   - Enter the product keys in the text area.
   - Drop the product key file into the text area.
   - Click **Browse** to select the product key license file from a location on your local system.

   A green check mark next to the product key indicates that the key is valid.

5. Click **Activate**.
   The **Manage licenses** dialog appears, providing you with an overview of the Switch modules and their current activation status. If you have activated a time-limited license, you'll see a yellow icon ; a permanent license results in a green icon next to the module concerned.

6. Click **Close**.

3.3.2. Activating Switch (offline method)

This procedure describes how to activate Switch *on a computer without internet access*.

Prerequisites:

- You must have an additional computer with internet access to communicate with the Enfocus web server.
- You need an Enfocus ID.

To create an Enfocus ID (on a computer with internet access), go to *https://my.enfocus.com/en/user/register* and follow the on-screen instructions. Your account is created immediately, so you can proceed with the activation procedure.

How it works:

Activating Switch offline consists of three steps:

1. Create an activation request on the computer on which you installed Switch.
2. Save this file on another computer with internet access and upload it to the Enfocus activation website. Enfocus will check your licenses and, if the license is valid, provide you with a response file.
3. Upload the response file to the computer on which you installed Switch and activate it.

Each of these steps is explained below.

To activate Switch

1. On the computer on which you installed Switch:
   a. Start Switch and connect to the local Switch Server.

      Activation is only possible on a local Switch Server.

      The Enfocus Software Activation dialog appears.
   b. Enter your Enfocus ID and password.
   c. Enter your product key by doing one of the following:
      - Type or copy-paste your product key in the Product key field.
      - Browse to your product key license file or drag and drop it into the Product key field.
   d. Select the **Off-Line Mode** checkbox.
   e. Click **Activate**.
   f. In the Off-Line Activation dialog, click **Save** and save the activation request file requestactivate.xml on your local computer.

2. On a computer with internet access:
   a. Make requestactivate.xml available.

      Tip: You can copy requestactivate.xml to a USB stick, and connect the USB stick to your online system.
   b. Go to *http://www.enfocus.com/products/activation?lang=en*
   c. Select **Offline Product Activation**, and click **Continue**.
   d. Upload requestactivate.xml, and click **Continue**.
   e. Fill in your Enfocus ID password, and click **Continue**.
   f. Click **Continue** to confirm.
      The Enfocus web server creates a file: response.xml.
   g. Download the file.

3. On the computer on which you installed Switch:
   a. Make response.xml available on this computer.
   b. In the Off-Line Activation dialog (see step 1f), in the right part, click **Load** and upload response.xml.
   c. Click **Activate**.
      You have activated Switch.
   d. Click **Close**.

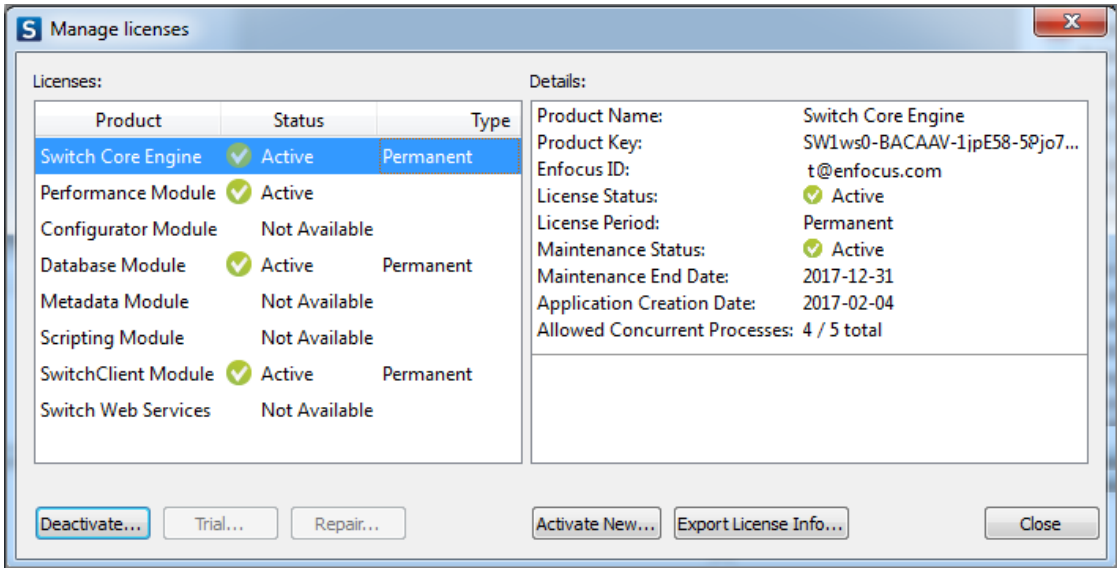
3.4. Managing your Switch licenses

Once you have installed Switch, you can manage your licenses from within the application. You can for example check the status of your licenses, activate additional modules, deactivate modules, export license information, and so on.

3.4.1. About the Switch licenses

Switch modules are activated via licenses or product keys. For each module you want to use, you need a separate license.

Note: An overview of your licenses can be found in the Manage licenses pane (**Help** > **Manage Licenses**).



Trial licenses

If you are new to Switch, you can try the software for a period of 30 days. Request a trial key via *the form on the Enfocus website*.

You will receive a key for the Switch Core Engine. The other modules can be activated separately via the **Trial** button in the Manage Licenses panel (see *Activating a Switch trial for additional modules (online method)* on page 20).

Module licenses

At the time of the purchase, you receive an HTML file with a key for each module you have bought.

The Switch Core Engine license is mandatory. The other modules are optional and can be activated afterwards when you need them. If the Switch Core Engine license expires before a module's trial period or time limit, then the modules will stop working too.

License Status versus Maintenance Status

The **License Status** indicates the validity of the license; if the license status is active, you have the right to use the Switch module.

The **Maintenance Status** (only shown in the details of the Core Engine) indicates if your maintenance contract for Switch is expired or about to expire. Maintenance is mandatory during the first year and includes free updates of the software and priority tech support.

The **Maintenance End Date** indicates the end of the maintenance period (not of the license!): after that date, the software will continue to work, but you will no longer be entitled to free updates and support. The Maintenance End Status will be "Expired" and the Maintenance End Date will be a date in the past.

If you renew your maintenance contract, you will receive a Switch Maintenance key. This key will have a new Maintenance End Date that will be taken into account to determine whether or not you have the right to upgrade. Do not forget to activate this new maintenance key, so the details and the new Maintenance End Date become visible in the Manage Licenses panel.

Upgrading to a new Switch version

To determine whether or not you are entitled to a new Switch version, the *Application Creation Date* is used.

The *Application Creation Date* is the release date of the Switch version installed on your computer. This date is compared to the *Maintenance End Date*: if that version of Switch was released before the Maintenance End Date, you're entitled to use it.

For example, if your maintenance expired on 28/02/2017, you have the right to upgrade to Switch 2017 (released on 14/02/2017), no matter what the current date is and although the Maintenance Status is "Expired".

However, if your maintenance expired on 20/01/2017, you do not have the right to upgrade to Switch 2017 (released on 14/02/2017); if you'd like to upgrade (from Switch 12 or 13), you must renew your maintenance contract.

For more information, refer to *Upgrading to a new version of Switch* on page 28.

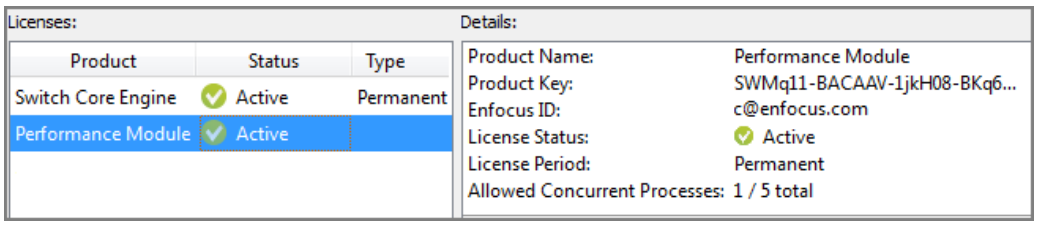
Note: The Switch 2018 license is backward compatible to Switch 13.x, meaning that you can use the Switch 2018 key to run previous versions of Switch if required.

Additional concurrent processes

The Switch Core Engine allows for up to 4 concurrent processes. If that's not sufficient, you can buy a number of additional concurrent processes through a license of the Performance Module.

To know how many concurrent processes have been licensed, check the value of the "Allowed Concurrent Processes" field in the details of the Core Engine or the Performance Module license.

The first number represents the number of allowed concurrent processes based on the selected module, the second number represents the total number of concurrent processes for the whole Switch installation. In the below example, 1 additional license for the Performance Module has been purchased (in addition to the 4 included in the Core Engine).



3.4.2. Checking the status of your Switch licenses

Check the status of your licenses, if you want to know which Switch modules are activated, when your licenses expire or when your maintenance contract ends. The end of your maintenance contract is important, because it determines whether or not you can upgrade to a new version of Switch.

To check the status of your Switch licenses

1. Open Switch.
2. On the **Help** menu, click **Manage licenses**.
3. In the left part of the Manage licenses dialog, select the module of which you want to see the status.
   The details of the selected module are shown in the Details pane on the right. For more information, refer to *About the Switch licenses* on page 18.

The table below explains the icons that represent the License Status.

Icon	Meaning
⚠	The license is time-limited. You can use the module concerned during a certain period of time. Check the License Period in the right part of the dialog.
✓	The license is permanent.
✗	The license has expired. You will not be able to use the module concerned.

3.4.3. Activating a Switch trial for additional modules (online method)

You can activate a 30-day trial for one or more additional modules.

Note: Contact your local reseller if you want to try the Switch Core Engine.

Trial versions cannot be deactivated; they become inactive once the trial period has expired.

This procedure describes how to activate Switch *on a computer with internet access*.

To activate a Switch trial for additional Switch modules

1. Start Switch and connect to the local Switch Server.

   Activation is only possible on a local Switch Server.

2. On the **Help** menu, click **Manage licenses**.
   The Manage licenses dialog appears.

3. Select the module(s) you want to activate.

4. Click **Trial**.

5. If you're not signed in in Switch yet, a dialog will pop-up. Enter your Enfocus ID and password.

   You should have created an Enfocus ID when activating the Switch Core Engine. If you don't remember your password, click the **Forgot Password?** link.

6. In the dialog that appears, click **Activate**.
   You have activated a Switch trial version. All information about the activated version (for example the validity period) is displayed in the right part of the **Manage licenses** dialog.

7. Click **Close**.

3.4.4. Activating a Switch trial for additional modules (offline method)

You can activate a 30-day trial for one or more additional modules.

Note: Contact your local reseller if you want to try the Switch Core Engine.

Trial versions cannot be deactivated; they become inactive once the trial period has been expired.

This procedure describes how to activate Switch *on a computer without internet access*.

Prerequisites:

- You must have an additional computer with internet access to communicate with the Enfocus web server.

How it works:

Activating Switch modules offline consists of three steps:

1. Create an activation request on the computer on which you installed Switch.
2. Save this file on another computer with internet access and upload it to the Enfocus activation website. Enfocus will provide you with a response file.
3. Upload the response file to the computer on which you installed Switch and activate it.

Each of these steps is explained in detail below.

To activate a Switch trial for additional Switch modules

1. On the computer on which you installed Switch:

   a. Start Switch and connect to the local Switch Server.

Activation is only possible on a local Switch Server.

b. On the **Help** menu, click **Manage licenses**.
The Manage licenses dialog appears.

c. Select the module(s) for which you want to activate a trial.

d. Click **Trial**.

e. In the Enfocus Software Activation dialog, select the **Off-Line Mode** checkbox.

f. Enter your Enfocus ID and password.

You should have created an Enfocus ID when activating the Switch Core Engine. If you don't remember your password, on your computer with internet access, go to *https://my.enfocus.com/en/user/password*.

g. Click **Activate**.

h. In the Off-Line Activation dialog, click **Save** and save the activation request file requestactivate.xml on your local computer.

2. On a computer with internet access:

a. Make requestactivate.xml available.

Tip: You can copy requestactivate.xml to a USB stick, and connect the USB stick to your online system.

b. Go to *http://www.enfocus.com/products/activation?lang=en*

c. Upload requestactivate.xml, and click **Continue**.

d. Fill in your Enfocus ID password, and click **Continue**.

e. Click **Continue** to confirm.
The Enfocus web server creates a file: response.xml.

f. Download the file.

3. On the computer on which you installed Switch:

a. Make response.xml available on this computer.

b. In the Off-Line Activation dialog (see step 1h), in the right part, click **Load** and upload response.xml.

c. Click **Activate**.
You have activated a Switch trial version. All information about the activated version (for example the validity period) is displayed in the right part of the Manage licenses dialog.

d. Click **Close**.

After updating the license keys, you must restart the application.

3.4.5. Activating additional Switch modules (online method)

If you have purchased one or more additional modules, you have to activate them by entering the product keys you received from your local reseller.

This procedure describes how to activate additional modules *on a computer with internet access*.

To activate additional modules

1. Start Switch and connect to a local Switch Server.

Activation is only possible on a local Switch Server.

2. On the **Help** menu, click **Manage licenses**.

The **Manage licenses** dialog appears.

3. Click **Activate New**.
4. If you're not signed in in Switch yet, a dialog appears. Enter your Enfocus ID and password.

   You should have created an Enfocus ID when activating the Switch Core Engine. If you don't remember your password, click the **Forgot Password?** link.
5. To supply your product key(s), do one of the following:
   - Enter the product keys in the text area.
   - Drag and drop the product key license file into the text area.
   - Click **Browse** to select the product file from a location on your local system.

   A green check mark next to the product key indicates that the key is valid.
6. Click **Activate**.

   In the right part of the dialog, a green icon (in case of a permanent license) or a yellow icon (in case of a time-limited license) appears next to the activated module(s).
7. Click **Close**.

After updating the license keys, you must restart the application.

3.4.6. Activating additional Switch modules (offline method)

This procedure describes how to activate additional modules *on a computer without internet access*.

Prerequisites: You must have an additional computer with internet access to communicate with the Enfocus web server.

If you have purchased one or more additional modules, you have to activate them by entering the product keys you received from your local reseller.

Activating Switch modules offline consists of three steps:

1. Create an activation request on the computer on which you installed Switch.
2. Save this file on another computer with internet access and upload it to the Enfocus activation website. Enfocus will check your licenses and, if the license is valid, provide you with a response file.
3. Upload the response file to the computer on which you installed Switch and activate it.

Each of these steps is explained in detail below.

To activate additional modules

1. On the computer on which you installed Switch:
   a. Start Switch and connect to a local Switch Server.

      Activation is only possible on a local Switch Server.
   b. On the **Help** menu, click **Manage licenses**.
      The Manage licenses dialog appears.
   c. Click **Activate New**.
   d. Enter your Enfocus ID and password.

You should have created an Enfocus ID when activating the Switch Core Engine. If you don't remember your password, on your computer with internet access, go to *https://my.enfocus.com/en/user/password*.

e. Enter your product key(s) by doing one of the following:

- Type or copy-paste your product key in the Product key field.
- Browse to your product key license file or drag and drop it to the Product key field.

f. Select the **Off-Line Mode** checkbox.

g. Click **Activate**.

h. In the Off-Line Activation dialog, click **Save** and save the activation request file requestactivate.xml on your local computer.

2. On a computer with internet access:

a. Make requestactivate.xml available.

Tip: You can copy requestactivate.xml to a USB stick, and connect the USB stick to your online system.

b. Go to *http://www.enfocus.com/products/activation?lang=en*

c. Upload requestactivate.xml, and click **Continue**.

d. Fill in your Enfocus ID password, and click **Continue**.

e. Click **Continue** to confirm.
The Enfocus web server creates a file: response.xml.

f. Download the file.

3. On the computer on which you installed Switch:

a. Make response.xml available on this computer.

b. In the Off-Line Activation dialog (see step 1h), in the right part, click **Load** and upload response.xml.

c. Click **Activate**.
You have activated the requested Switch modules.

d. Click **Close**.

After updating the license keys, you must restart the application.

3.4.7. Deactivating Switch modules (online method)

Deactivate a Switch module if you want to move the license for this module to another computer, or if for any reason you don't need it anymore.

This procedure describes how to deactivate additional modules *on a computer with internet access*.

To deactivate Switch modules

1. Start Switch and connect to the local Switch Server.

Deactivation is only possible on a local Switch Server.

2. On the **Help** menu, click **Manage licenses**.

3. In the left part of the Manage licenses dialog, select the module(s) you want to deactivate.

To select multiple modules, hold down the **Ctrl** key while clicking the modules concerned.

The details of the selected module are shown in the Details pane on the right. For more information, refer to *About the Switch licenses* on page 18.

4. Click **Deactivate**.
5. Make sure the **Off-Line Mode** checkbox is cleared.
6. If you want to export the license file (with the key being deactivated), so that you can reactivate it on another system, proceed as follows:
   a. Select the **Export license information during deactivation** checkbox.
   b. Save the product key license file on your computer.
7. Click **Deactivate**.
   The selected license is deactivated.
8. Click **Close**.

3.4.8. Deactivating Switch modules (offline method)

This procedure describes how to deactivate additional modules *on a computer without internet access*.

You must have an additional computer with internet access to communicate with the Enfocus web server.

Deactivate a Switch module if you want to move the license for this module to another computer, or if for any reason you don't need it anymore.

Deactivating Switch offline consists of three steps:

1. Create a deactivation request on the computer on which you installed Switch.
2. Save this file on another computer with internet access and upload it to the Enfocus activation website. Enfocus will provide you with a deactivation response file.
3. Upload the response file to the computer on which you installed Switch and deactivate it.

These steps are explained in detail below.

To deactivate Switch modules

1. On the computer on which you installed Switch:
   a. Open Switch
   b. On the **Help** menu, click **Manage licenses**.
   c. In the left part of the Manage licenses dialog, select the module(s) you want to deactivate.

      To select multiple modules, hold down the **Ctrl** key while clicking the modules concerned.
   d. Click **Deactivate**.
   e. In the Enfocus Software Activation dialog, select the **Off-Line Mode** checkbox.
   f. Select the **Export license information during deactivation** checkbox.
      This enables you to export the license file (with the key being deactivated), so that you can reactivate it on another system.
   g. Click **Deactivate**.
      A dialog pops up, allowing you to select a download location and a name for the license backup file (LicensesBackup.html).

h. Browse to a download location, and click **Save**.
The Off-Line Deactivation dialog appears. It allows you to download a deactivation request file.

i. In the left part of the dialog, click **Save** and save the deactivation request file requestdeactivate.xml on your computer.

2. On a computer with internet access:
   a. Make requestdeactivate.xml available.

   Tip: You can copy derequestactivate.xml to a USB stick, and connect the USB stick to your online system.

   b. Go to *http://www.enfocus.com/products/activation?lang=en*
   c. Upload requestdeactivate.xml, and click **Continue**.
   d. Fill in your Enfocus ID password, and click **Continue**.
   e. Click **Continue** to confirm.
   The Enfocus web server creates a file: response.xml.
   f. Download the file.

3. On the computer on which you installed Switch:
   a. Make response.xml available on this computer.
   b. In the Off-Line Deactivation dialog (see step 1i), in the right part, click **Load** and upload response.xml.
   c. Click **Deactivate**.
   You have deactivated the selected Switch module(s).
   d. Click **Close**.

3.4.9. Repairing Switch (online method)

Licenses are linked to the hardware characteristics of your computer. If the hardware characteristics change (for example: you added memory or a new network card), the license is not valid anymore and you must repair it.

This procedure describes how to repair Switch *on a computer with internet access*.

To repair Switch

1. Start Switch and connect to a local Switch Server.
   Repairing licenses is only possible on a local Switch Server.

2. On the **Help** menu, click **Manage licenses**.
   The Manage licenses dialog appears.

3. Select the module(s) that need to be repaired.
   If a module needs to be repaired, the **Repair** button is activated.

4. Click **Repair**.
   The Enfocus Software Repair dialog is opened.

5. Make sure that the **Off-Line Mode** checkbox is cleared.

6. Click **Repair**.

Your system communicates with the Enfocus web server and repairs your license. In case of problems, please contact Enfocus:

- activation@enfocus.com
- *http://www.enfocus.com/en/support/request-feature-report-problem*

7. Click **Close**.

3.4.10. Repairing Switch (offline method)

This procedure describes how to repair Switch *on a computer without internet access*.

Prerequisite: You must have an additional computer with internet access to communicate with the Enfocus web server.

Licenses are linked to the hardware characteristics of your computer. If the hardware characteristics change (for example: you added memory or a new network card), the license is not valid anymore and you must repair it.

Repairing Switch offline consists of three steps:

1. Create a repair request on the computer on which you installed Switch.
2. Save this file on another computer with internet access and upload it to the Enfocus activation website. Enfocus will provide you with a deactivation response file.
3. Upload the response file to the computer on which you installed Switch and repair it.

These steps are explained in detail below.

To repair Switch

1. On the computer on which you installed Switch:
   a. Start Switch and connect to a local Switch Server.

      Repairing licenses is only possible on a local Switch Server.
   b. On the **Help** menu, click **Manage licenses**.
      The Manage licenses dialog appears.
   c. Select the module(s) that need to be repaired.

      If a module needs to be repaired, the **Repair** button is activated.
   d. Click **Repair**.
      The Enfocus Software Repair dialog is opened.
   e. Select the **Off-Line Mode** checkbox.
   f. Click **Repair**.
   g. In the Off-Line Repair dialog, click **Save** and save the repair request file requestrepair.xml on your local computer.

2. On a computer with internet access:
   a. Make requestrepair.xml available.

      Tip: You can copy requestrepair.xml to a USB stick, and connect the USB stick to your online system.
   b. Go to *http://www.enfocus.com/products/activation?lang=en*
   c. Upload requestrepair.xml, and click **Continue**.
   d. Fill in your Enfocus ID password, and click **Continue**.
   e. Click **Continue** to confirm.

The Enfocus web server creates a file: response.xml.

f. Download the file.

3. On the computer on which you installed Switch:

a. Make response.xml available on this computer.

b. In the Off-Line Repair dialog (see step 1f), in the right part, click **Load** and upload response.xml.

c. Click **Repair**.
You have repaired Switch. In case of problems, please contact Enfocus:

- activation@enfocus.com
- *http://www.enfocus.com/en/support/request-feature-report-problem*

d. Click **Close**.

3.4.11. Upgrading to a new version of Switch

Upgrading to a new Switch version will replace your current version. As soon as you launch Switch, all your flows will be upgraded as well.

Important: Before you start, check your maintenance status (by selecting **Help** > **Manage licenses**). You can only upgrade if the Switch Maintenance End Date is more recent than the Application Creation date (i.e. the creation date of the new Switch version). If this is not the case, please contact your local reseller and request a maintenance key.

To upgrade your current version to a new version of Switch

1. Backup your current Switch environment.

This allows you to restore the system in case of problems during the upgrade process.

2. Quit all Switch processes (Designer, Server, Watchdog, Scripter) (using **File** > **Stop Switch Server**).

If the preference **Start Server automatically at login** is set to **No** and if there are no active flows, quitting the Designer will stop the Switch Server and the Watchdog automatically.

If the preference **Start Server automatically at login** is set to **Yes**, you can stop the server manually. Refer to *Stopping the Switch Server* on page 460.

Tip: To ensure that there are no Switch processes running, you can use the Activity Monitor on Mac or the Task Manager on Windows.

3. *Install the new version of Switch*.

4. Launch Switch.
After installing a new version of Switch, when it is launched for the first time, Switch detects the version change and presents a warning dialog.

5. Click the **Proceed** button.

If you click the **Cancel** button, Switch quits without making any changes to the flows. In that case, you will not be able to work with these flows in the new version.

Switch makes a backup of existing flows and then re-imports them. While re-importing the flows, Switch adjusts all flow elements and properties so that they comply with the current version of Switch. If there are any problems, a warning appears. For more information, refer to *Importing and exporting flows* on page 275.

3.5. Starting Switch

Prerequisites: You must have administrator rights on your computer to run Switch.

When starting Switch, you are actually starting the Switch Designer. With Switch Designer you can then connect to a local Switch Server, or to a Switch Server installed (and already running) on another computer.

Note: Switch Server allows only one connection at a time, from either a local or a remote Designer. The same holds for Switch Designer: Switch Designer can only be connected to one single (local or remote) Switch Server at a time.

To start Switch

1. Do one of the following:
   - Select Switch in the Start menu (Windows)
   - Locate the application (Switch.exe or Switch.app) and double-click to start Switch.

   Switch is installed by default in the following directory:
   - Windows: C:\Program Files (x86)\Enfocus\Enfocus Switch <version number>
   - Mac OS: /Applications/Enfocus/Enfocus Switch <version number>
2. In the Connect to Switch Server dialog, do one of the following:
   - To connect to the Switch Server installed on your local computer, select the **Connect to local Switch Server** checkbox.
   - To connect remotely, i.e. to connect to a Switch Server installed on another computer, enter the required details:
     - IP address or host name of the computer on which you have installed Switch Server.

       Note: The previously used IP address (if any) is stored.
     - Port number

       Note: You can set a default value for the port number. See *Switch preferences: Internal communication* on page 49.
     - User name and password as required.

       Note: This depends on the setup in the Users pane.

Note: To be able to connect remotely, the Switch Server must be running on the remote computer. For more information, refer to *Starting/restarting Switch Server* on page 31.

Tip: You can automatically start the Switch Server every time you log in to the operating system, by enabling the corresponding user preference (**Start Switch Server automatically at login**). See *Switch preferences: User interface* on page 34. Note that when this preference is enabled, Switch Server will remain running even if you exit Switch Designer.

If you connect to a local Switch Server, the Switch Server is started automatically when starting Switch.

3. To hide this dialog next time when you start Switch, clear the **Show dialog at startup** checkbox.

   Note: If you hide this dialog, the selected connection (local or remote connection to a particular computer) is considered the default connection. You can afterwards still change the connection from within Switch, by selecting **File** > **Connect to Switch Server**.

4. Click **OK**.
   If you're signed in with your Enfocus ID already, Switch Designer is opened. You can ignore the remaining steps of this procedure. If you're not signed in yet, the **About Switch** dialog appears and you should continue with the next step of this procedure.

5. On the **Sign In** tab, enter your Enfocus ID and password.

   You should have created an Enfocus ID when activating the Switch Core Engine. If you don't remember your password, click the **Forgot Password?** link.

   Note:

   - This step is not obligatory (but highly recommended), unless you want to activate licenses or buy apps in the Enfocus Appstore. See *Working with apps in Switch* on page 299.
   - You remain signed in (until you sign out explicitly), so next time you start Switch, you won't see this dialog anymore.

6. Click **Close**.
   Switch Designer is opened. In the title bar of the Switch Designer, you can see:

   - If you're connected with Remote Designer: Your user name followed by "@" and the IP address or host name (as entered in step 2) of the computer you are connected to, for example: "user@Switch Server MAC (10.33.133.213)"
   - If you're connected with a local Designer: The name of the Switch Server followed by "(localhost)".

Note: Remember that your access rights depend on the settings in the Users pane. Users having read-only access (this is indicated in the title bar), will not be able to edit flows or to change settings.

7. If you're launching Switch for the first time, the Switch Insight Dashboard dialog pops up. Read the text carefully and click **Yes, I'd like my Dashboard** to get your own personal dashboard.

   You can change your mind any time. For more info, refer to *The Switch Insight Dashboard* on page 461.

3.6. Starting/restarting Switch Server

Starting Switch Server

The Switch Server must be running in order to process tasks.

However, you do not have to start the Switch Server manually:

- If the Switch Server is configured to start automatically at login (see *Switch preferences: User interface* on page 34), it starts when you log in to your operating system.
- On Windows, if the Switch Watchdog is configured as a Windows service, Switch Server starts when you log in to your operating system.
- If Switch Server is not running when logging in to your operating system, the Switch Server is started when you open Switch and connect to the *local* Designer.

Note: If the Switch Server is not yet running, connecting to the Switch Server with Remote Designer is not possible! You must first connect to a local Designer (which starts the Switch Server), before you can use the local Designer.

Restarting Switch Server

Restarting the Switch Server is only necessary if there are changes in the preferences or licenses which require a Server restart.

To restart Switch Server

In Switch *local* Designer, select **File** > **Restart Switch Server**.

3.7. Troubleshooting

When installing or activating Switch, you may encounter one of the following problems.

Activation license failed

If activating the license failed, check the following:

- If you copy-pasted the product key, double-check the license key pasted in the text field. You may have forgotten part of the key, or you may have added redundant spaces by accident.
- If you uploaded a file, try with a new copy of the file. It may have been corrupted.
- If this doesn't solve the problem, contact your local reseller and ask for a new activation file.

Activation license expired

If your license has expired, contact your dealer to resolve this issue.

Not all modules are activated

If one of the modules you purchased for Switch is not activated, double-check whether you received multiple activation files, and whether you have uploaded all of them.

If that does not resolve your problem, contact your local reseller and ask for the missing licenses.

Need more help?

Contact the Enfocus support team using our Support Portal: *http://www.enfocus.com/supportportal*.

4. Configuring Switch

Once you have installed and activated Switch, we recommend setting up:

- *User preferences*

  Provide Switch with the required data to send e-mails and notifications, to use Active Directory settings etc. Furthermore, you may want to change the language of the interface, to set the preferences for error messages etc.

- *Users*

  If you have licensed the SwitchClient Module, you should define which users are allowed to access Switch through Submit points and/or Checkpoints, and assign these users the appropriate access rights.

  If you want to allow certain users to view messages and/or jobs via the Switch Web Portal, you should explicitly do so via the Users pane.

  If you want to allow certain users to view or create job boards and/or dashboards on the Switch Web Portal, you should also do so via the Users pane.

  If you are using Remote Designer, you should define who has the right to access the Switch Server remotely.

- *Switch Watchdog (Windows only) as a Windows Service*

  Set up Switch Watchdog as a Windows Service, to allow Switch to continue processing after you have logged off from the computer.

- *Setting up custom icons for job boards* on page 69

  If you're using job boards on the Switch Portal, you may consider replacing the standard icons for file types with your own images.

4.1. Configuring Switch user preferences

Switch user preferences allow you to:

- Customize Switch to your needs.

  You can for example choose the language of the interface, indicate whether or not unavailable configurators must be hidden, determine how many processes are allowed to run in parallel etc.

- Provide Switch with data it needs for sending e-mail notifications, setting up FTP connections, connecting to databases etc.

Note: Note that, when launching Switch using Remote Designer, a number of user preferences are hidden. Furthermore, if you have limited access (read-only access), you will only be able to view the preferences; you will not be able to change them. For more information, refer to *Configuring Switch users* on page 59.

4.1.1. Setting your Switch preferences

After you have installed and activated Switch, we recommend going over the user preferences and setting them as required. Note that a number of settings are required, in order to run Switch, for example the name of the Switch Server and, if you want to use Active Directory in Switch, the Active Directory settings.

To set your Switch user preferences

1. Navigate to:
   - On Windows OS : **Edit** > **Preferences**.
   - On Mac OS: **Enfocus Switch** > **Preferences**.

   The User preferences dialog appears.
2. In the left part of the dialog, click a category, for example User interface.
   The corresponding properties are shown in the right part of the dialog. The meaning of the different options is explained further in this manual.
3. Enter the required values.

4.1.2. Switch preferences: User interface

These preferences allow you to configure some aspects of the Switch user interface.

Property	Description
Designer Language	The language of the user interface of the Switch Designer. You can select one of the following languages: • English • German • French • Chinese • Japanese **Note:** • Restart the Switch Designer to apply your changes. • You can also configure the language of the Switch Server. For more information, refer to *Switch preferences: Processing* on page 41.
Large icons in elements pane	If set to **Yes**, the Flow elements pane displays large icons; otherwise it displays small icons.
Save flows automatically	• If set to **Yes**, flows are saved automatically before they are processed (activated, imported, exported). • If set to **No**, you're explicitly asked if you want to save the changes before activating, importing or exporting the flow

Property	Description
	Note: This preference can also be set to **Yes** by selecting the **Save flows automatically** checkbox in the **Modified flows** dialog. That is the dialog that pops up when you want to activate, import or export a modified flow.

Start Switch Server automatically at login	• If set to **Yes**, (default) the Switch Server is started automatically when the user logs in, and it remains running, even if the user exits Switch Designer.
	• If set to **No**, the Switch Server will be started automatically when the local Designer is started. If the local Designer exits, the behavior depends on the currently active flows:
	  • If no flows are active, Switch Server is stopped automatically.
	  • If at least one flow is active, the preference below (When exiting the flow designer) will determine what happens.

When exiting the flow designer	This option is only available if **Start Switch Server automatically at login** is set to **No**. It determines what happens to the Switch Server when the user quits Switch Designer: **Note:** This preference is taken into account only in case there are **currently active flows**; otherwise Switch Server always exits disregarding the preference value. Options: • **Ensure processing is started:** When quitting Switch Designer, Switch Server remains running in the background and continues processing the flows that are currently active. • **Ensure processing is stopped**: When quitting Switch Designer, all active flows are stopped and Switch Server exits. • **Ask the user** (default option): When quitting Switch Designer, Switch displays a dialog so the user can decide what to do. The user can choose either to continue processing the active flows in the background or stop all active flows and exit.
Show messages in Designer (beta feature)	This option determines how the Log Messages overview is shown when clicking the **Messages** button or **View** > **Messages** in the Switch Designer: • If set to **Yes**, the Messages overview is opened inside Switch Designer, in the Messages view (not in a separate window). • If set to **No**, the Messages overview is opened in a seaparate browser window, outside the Switch Designer user interface.

Property	Description
	Note: This feature is not yet supported on all systems. If it doesn't work on a your system, you'll get an empty window instead of the Messages view.

4.1.3. Switch preferences: Mail send

These preferences allow you to configure the settings for the Mail send and the Checkpoint via mail tool. If you do not configure them, you will not be able to send e-mail notifications. You can check if the settings are configured correctly by clicking the **Test connection** button at the bottom of the dialog.

Property	Description
SMTP server address	The URL or IP address of the SMTP email relay server. Example: smtp.gmail.com
SMTP port	The port used by the SMTP server.
SMTP server requires authentication	Defines whether the SMTP server requires authentication. If set to **Yes**, following additional fields appear: • *User name*: The login name for the SMTP server, for example: user@gmail.com. Leave empty if none is required. • *Password*: The password for the SMTP server. Leave empty if none is required. • *Use secure password verification*: Defines whether or not to use secure password verification. The following secure authentication schemes are supported: • USER_PASSWORD • NTLM • CRAM-MD5 • KERBEROS
Encrypt connection	Defines whether or not the mail server requires an encrypted connection (TLS1, 1.1, 1.2). Options: Yes/No.
Sender name	The sender's name for outgoing email messages.
Sender address	The sender's address for outgoing email messages.

Note:

- The sender name and email address are used in the _From _SMTP header that is normally shown by email client applications as 'From' field of an email. If the 'Reply

to' field of an email is not defined, the content of the 'From' field is used to send a reply.

- As of Switch 2018 update 2, it is possible to use a different sender name and address for a particular flow. To do so, you can specify the new name, email address and authentication parameters (i.e. the user name and password linked to this email address) in the flow element concerned. Refer to *Mail send* on page 176 and *Checkpoint via mail* on page 184.

Example: The screenshot below is an example of the *Mail send* preferences required for sending e-mails using Gmail.

Property	Value
SMTP server address	smtp.gmail.com
SMTP port	587
SMTP server requires authentication	Yes
User name	examplesend@gmail.com
Password	*******
Use secure password verification	No
Encrypt connection	Yes
Sender name	Test User
Sender address	examplereceive@gmail.com

4.1.4. Switch preferences: FTP proxy

If your system environment requires FTP connections to pass through a proxy server, you must fill in the configuration details for the proxy server. Otherwise, you will not be able to use the FTP receive and FTP send tools.

Property	Description
Name or IP address of host	Name or IP address of the proxy server on your local network.
Type of proxy	The type of proxy: • **No proxy**: no proxy is required for FTP connections • **Tunneling proxy**: uses the HTTP protocol • **SOCKS4 proxy**: uses the SOCKS4 protocol • **SOCKS5 proxy**: uses the SOCKS5 protocol
Proxy user name	The user name for logging in to the proxy server.
Proxy password	The password for logging in to the proxy server.
Proxy port	The port number for communicating with the proxy server.

Note: If you are using the FTP proxy protocol (type of proxy = No proxy), do not forget to enter the appropriate proxy information in the FTP receive and FTP send properties:

- In the **FTP server address** property, enter the name or IP address of the proxy server (instead of the FTP site being targeted).
- In the **user name** property, append an @ sign and the target FTP site address (domain or IP address) to the regular user name ("<ftpserverusername>@<ftpserveraddress>").
- The other properties, including the password, remain unchanged.

See also: *FTP receive* on page 163 and *FTP send* on page 169.

4.1.5. Switch preferences: HTTP proxy

If your system environment requires HTTP connections to pass through a proxy server, you must fill in the configuration details for the proxy server. Otherwise, you will not be able to access the internet or external services (e.g. upload files to DropBox using the HTTP request flow element or download apps from the Enfocus Appstore).

Property	Description
Use HTTP proxy	Turn on or off HTTP proxy support. If set to **Yes**, an HTTP proxy connection will be estabilished for all HTTP(S) operations in Switch. The depending properties are shown and filled in automatically if they are present in the system settings.
Proxy server	Name or IP address of the proxy server on your local network.
Proxy port	Port number for communication with the proxy server.
Authenticate	If set to **Yes**, credentials are required for logging on to the proxy server. The following dependent properties pop up: • Proxy user name • Proxy password The type of authentication is always Basic Authentication.
Bypass proxy for these servers	Define the servers for which the proxy settings should NOT be used, for example for local communication between different internal servers or between the Switch Server and the Dashboard Service. You can enter the IP addresses (one per line) or the host name. Note that you can use the wildcards "*" and "?" to denote a range of servers.

Property	Description
	Example: 192.166.4.14?

4.1.6. Switch preferences: Mac file types

Mac files not always have a filename extension. Still, filename extensions are useful, to avoid confusion and to make it possible to exchange files with other operating systems (Windows, Unix). That's why Switch offers the possibility to automatically add filename extensions to all files (without filename extension) arriving in Switch. This filename extension is based on Mac file type information associated with the file (i.e. the file type and file creator codes).

For more information, refer to to *About Mac file types* on page 39.

Property	Description
Add filename extension	If set to **Yes**, Switch automatically adds a filename extension to arriving Mac files; if set to **No** (default value), the filename is left unchanged.

4.1.6.1. About Mac file types

Background information

Microsoft Windows uses the *filename extension* (which is required) to determine a file's type.

Apple's Mac OS X uses the *filename extension* (if present) and in addition uses the *file type and creator codes* (if present) stored in the catalog entry for the file. This allows Mac OS X to be compatible with the external world (i.e. Windows and Unix, which use filename extensions) and with Mac Classic (which exclusively used Mac file types).

Successfully exchanging files in a mixed platform environment requires performing a *mapping between Mac file types and filename extensions*, and since the catalog entries for file type and creator codes are supported only by Mac-specific file systems (such as HFS), they must be emulated on foreign file systems (such as FAT).

Mac OS X (and Mac Classic) also allows files to have a **resource fork** (a second stream of information in addition to the main data). In its most extreme form, a file may store all of its information in the resource fork and have zero data bytes (as is the case for certain types of Classic font files). Modern applications tend to rely less on the contents of the resource fork than Classic applications, but in general the resource fork cannot be ignored.

Again resource forks are directly supported only by Mac-specific file systems, and thus must be emulated on foreign file systems.

Emulation with dot-underscore file (AppleDouble)

When a Mac OS X user copies a file from a Mac-specific volume to a foreign volume, the system splits out any information that is not located in the data fork of the file and writes it to a hidden file on the destination volume. The name of this file is the same as the original file except that it has a dot-underscore prefix. For example, if the user copies a file named MyMug.jpg to a foreign volume, there will be a file named ._MyMug.jpg in addition to the MyMug.jpg file in the same location.

When a Mac OS X user copies a file from a foreign volume to a Mac-specific volume, the system looks for a matching "dot-underscore" file. If one exists, the system uses the information in the dot-underscore file to recreate the resource fork and file type attributes. If the hidden file does not exist, these attributes are not recreated.

Emulation using NTFS alternate data streams

Although this feature is not widely known, the NTFS file system (used by most modern Microsoft Windows systems) supports alternate data streams in a file. In a way this feature is a generalization of the Mac resource fork concept. Each individual stream can be opened for input or output, but otherwise the file (with all its associated streams) is managed as a single unit. The Windows user interface provides no interface to alternate data streams, and regular Windows applications never use alternate data streams.

Several AppleTalk file sharing protocol (AFP) implementations for Windows servers, including Microsoft's own implementation, emulate Mac file types and resource forks on the Windows NTFS file system using alternate data streams. Note that these AFP implementations do not support the FAT file system since it doesn't offer alternate data streams.

This mechanism has the benefit of storing the emulated information in one single file with the regular data. However the presence of this extra data is extremely hard to detect for a Windows user (i.e. only through specialized shareware utilities).

Furthermore, while the Windows file system correctly copies any alternate data streams with a file, the extra information is lost when the file is attached to an e-mail message or when it is stored in an archive such as a ZIP.

Automatically adding filename extensions

On Windows a file must have a filename extension to be correctly recognized by the applications operating on it; so there is almost never a reason for not including the extension that is appropriate for the file's type.

Even on Mac OS X, while it is not a requirement, there seem to be several factors in favor of including filename extensions when working with automated processes:

- It makes an implicit attribute explicit for the human operator, avoiding confusion (i.e. the operator and the system might interpret the file type differently if it was not made explicit).
- It allows files to be more easily interchanged with foreign systems (which may happen even if it is not currently planned).

Therefore Switch offers a function to automatically add an appropriate filename extension to arriving files, based on Mac file type information associated with the file. This feature is turned on by default (recommended), and it can be turned off in the Preferences dialog.

Specifically, when Switch detects that a new file has arrived (and the "Add filename extension" feature is enabled), Switch looks for Mac file type information in the following way:

- On Mac OS X, it looks in the file system catalog.
- On Windows, it looks for an appropriate alternate data stream attached to the file, and it looks for a dot-underscore file with the same name as the file (in other words, Switch supports both emulations discussed above).

If Switch finds meaningful Mac file type information, and if it can locate the corresponding filename extension in its built-in table, and if the file doesn't already have the appropriate filename extension, Switch will add the filename extension to the file's name. Otherwise the filename is left unchanged.

Copying files

When Switch copies or moves a file under its own control (for example, between two folders), it ensures that all available Mac file type information and resource fork data is copied along with the file. (On Mac OS X this means using the native file operations; on Windows this involves supporting the emulations discussed above).

This preserves Mac file type information (which may be superfluous if a filename extension is also present), but more importantly it also preserves any resource fork data - which allows, for example, to process Classic Mac fonts through Switch on a Windows system.

Note however that other processes and third-party applications may not carry along Mac file types and resource forks. On Windows this is almost never the case, and even on Mac some modern applications no longer support these Classic features.

Changing the file type

The file type tool allows setting a file's filename extension and/or Mac file and creator types to a specified value. This is handy if you know the correct type of a file (for example, because it was created by an application under your control) but you suspect that it may not have the appropriate filename extension or Mac file type information.

Filtering on file type

Several Switch tools offer the possibility to sort files based on file type; see *Specifying file filters* on page 241.

4.1.7. Switch preferences: Processing

These preferences allow you to configure the way jobs are processed in Switch.

A number of these preferences affect the performance of Switch. For more information, refer to *Switch performance tuning* on page 463.

Property	Description
Server language	Language used by the Switch Server for alert e-mails.You can select one of the following languages: • English • German • French • Chinese • Japanese **Note:** • *Restart the Switch Server* to apply your changes. • You can also configure the language of the Switch Designer. For more information, refer to *Switch preferences: User interface* on page 34.
Language environment	Indicates the overall language environment in which Switch is installed: Western or Japanese.

Property	Description
	This setting affects the text encoding defaults for email and ZIP compression to match the legacy standards used in the selected language environment (that is, for interacting with software that does not use Unicode).
Concurrent network transfer tasks	The number of FTP and e-mail file transfers (counting both send and receive) allowed to occur in parallel.
Concurrent transfers to the same site	The number of file transfers to the same FTP site allowed to occur in parallel (counting both send and receive). If there is no limit other than the overall maximum number of concurrent file transfers (as determined by the previous preference), select **Automatic** ; otherwise select **Inline value** and enter a value between 1 and 100.

Concurrent processing tasks	The number of job processing tasks allowed to run in parallel.
	
	Note: Recommended value = the number of CPUs of the server + 1.
	
	"Processing tasks" are tasks performed by the following flow elements:
	
	• All flow elements in the Configurators section
	• The following elements in the Basics section:
	  • Set hierarchy path
	  • Ungroup job
	  • Split multi-job
	  • Assemble job
	  • Execute command
	• The following elements in the Tools section:
	  • Sort by preflight state
	  • Compress
	  • Uncompress
	  • Split PDF
	  • Merge PDF
	  • Hold job
	  • Inject job
	  • Rename job
	  • Sort job
	  • Log job info
	  • Sort files in job
	• The Script element in the Scripting section:
	  Heavy scripts affect the number of concurrent processing tasks. For more details about light and heavy scripts, see *Execution slots* on page 297.

Property	Description

	• The following elements in the Communication section:
	  • Pack job
	  • Unpack job
	  • Monitor confirmation
	• The Database connect element in the Database section.

Default number of slots for concurrent elements	The number of slots available for scripts and tools working in concurrent mode: • 0 = Tasks will be executed in concurrent mode and all available slots will be used. • 1 (default) = Tasks will be executed one after the other (serialized execution mode). • 2 or more = Tasks will be performed in concurrent mode. In Switch, the default value set in the Preferences can be overruled for a particular flow. Proceed as follows: **1.** Set the the *flow* property **Allow advanced performance tuning** to **Yes**. **2.** For all flow elements (in that particular flow) that support concurrent processing, change the element property **Number of slots** from Default to any other value. **Note:** Be cautious when tuning performance properties; unwary use may slow down performance!
Scan user-managed folders every (seconds)	The frequency with which the user-managed folders (i.e. the folders with a path defined by the user) and Submit hierarchies (i.e. by default user-managed) are scanned for newly arrived jobs.
Process file only after (seconds)	The time for which newly arrived jobs must be stable before they are processed; to avoid picking up an input job before it has been completely written to disk, Switch ensures that the size of the file (or the total size of a job folder) has not changed for at least this amount of time before processing the job.
Reactivate flows upon startup	When starting up, if this property is set to **Yes**, Switch automatically reactivates flows that were active when Switch was closed; otherwise all flows are inactive after startup.
Stop processing if free disk space is less than (MB)	If the amount of free disk space for application data is lower than the entered amount, processing will stop, avoiding "Disk Full" processing errors.

4.1.8. Switch preferences: Error handling

These preferences allow you to configure the way problems are handled in Switch.

Property	Description
Abort file transfers after (minutes)	Time in minutes. If an FTP or e-mail file transfer takes longer than this, it is considered crashed or locked up and it is aborted. If the value is set to 0, the transfer will never be aborted.
Abort processes after (minutes)	Time in minutes. If a process other than a file transfer takes longer than this, it is considered crashed or locked-up and it is aborted. If the value is set to 0, the transfer will never be aborted.
Abort FTP transfers on stopping flow	Determines whether or not ongoing FTP transfers are aborted immediately when a flow is stopped: • **Yes**: The flow is stopped immediately. FTP transfers in progress are aborted. This may result in partially uploaded and corrupt files. • **No** (default setting): The flow is stopped after the FTP transfer has been finished.
Retry mail transfers after (minutes)	Time interval in minutes. If a mail transfer fails, Switch tries again after the specified number of minutes. If the value is set to 0, Switch stops trying. (not recommended)
Retry FTP transfers after (minutes)	Time interval in minutes. If an FTP transfer fails, Switch tries again after the specified number of minutes. If the value is set to 0, Switch stops trying. (not recommended)
Retry unreachable folder after (minutes)	Time interval in minutes. If a folder cannot be reached, Switch tries again after the specified number of minutes. If the value is set to 0, Switch stops trying. (not recommended)
Retry failed external processes after (minutes)	Time interval in minutes. If an external process fails, Switch tries again after the specified number of minutes. If the value is set to 0, Switch stops trying. (in this case: the recommended value!)
Send crash reports	If Switch crashes, a detailed crash report is generated automatically. This information is useful for Enfocus to improve its software. You can choose to: • Not send this information to Enfocus (**Never**). • Automatically send the crash reports to Enfocus (**Always**).

Property	Description
	• Have the user decide whether or not to send a crash report (**Ask user**).

4.1.9. Switch preferences: Problem alerts

These preferences allow you to configure the way system administrators are notified of problems.

Property	Description
Send problem alerts to	Enter the destination e-mail addresses (one per line) and the body text for your alert message; information about the error will be appended to the body text.
Problem job arrives	If set to **Yes**, an alert is sent whenever Switch moves a job to the Problem jobs folder.
Processing takes more than (minutes)	Send an alert if a process, other than the file transfer process, takes longer than the time set (in minutes) here. If set to 0, no alert will be sent.
Mail server is down for more than (minutes)	Send an alert when an email server cannot be accessed for the time (in minutes) indicated here. If set to 0, no alert will be sent.
FTP site is down for more than (minutes)	Send an alert when an FTP site cannot be accessed for the time (in minutes) indicated here. If set to 0, no alert will be sent.
Folder is unreachable for more than (minutes)	Send an alert when a backing folder is unreachable for more than x minutes.
External process fails	If set to **Yes**, an alert is sent when a process other than folder, fails (that is, its process is put in the "problem process" state).
Switch Server quit unexpectedly	If set to **Yes** an alert is sent when upon startup, Switch detects that the Switch Server quit unexpectedly (due to a hardware or software failure).
Alert if free disk space for application data is less than, MB	Send an alert when the amount of free disk space for application data is less than the defined amount.

4.1.10. Switch preferences: Application data

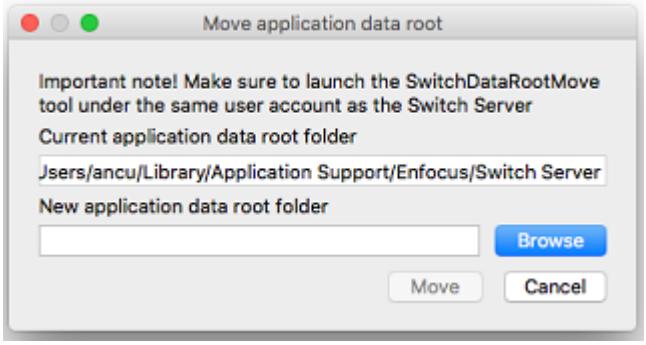
These preferences determine the location and configure the cleanup mechanism for Switch's application data.

Switch stores a lot of application-specific data, such as:

- Flow definitions (defined or imported with the flow designer).
- Auto-managed backing folders (and their contents, i.e. jobs being processed through flows).
- Internal job tickets pointing to jobs being processed.
- Log messages.

All this data is stored in a nested folder hierarchy under a single root folder, which is called the **Application data root**.

Some temporary application data cannot be removed automatically. To ensure that the amount of data does not grow indefinitely, Switch performs a cleanup process at regular intervals.

Property	Description
Application data root	The location of the application data, i.e. the root folder for the hierarchy in which the Switch application data is stored. Default location: • Windows: C:\Users\<user>\AppData\Roaming\Enfocus\Switch Server • Mac OS: /Users/<user>/Library/Application Support/Enfocus/Switch Server/ **Note:** • Changing the location of the application data root is a substantial operation and requires all Switch processing is stopped. To change the application data root, close Switch (**File** > **Stop Switch Server**) and run the SwitchDataRootMove tool in the Switch installation folder. You will be asked to enter the new location.  **Important remark!** Make sure to launch the SwitchDataRootMove tool under the same user account as the Switch Server! • Changing data in the Application data folder is NOT allowed, unless explicitly requested by the Enfocus support team!

Property	Description
Keep internal job tickets for (hours)	The time period (in hours) after which internal job tickets may be deleted for jobs that left the flow; Switch will not delete internal job tickets for jobs that are still active. **Note:** A job is considered inactive, if it is located in a flow output folder (i.e. a folder without outgoing connections) disregarding if the job's unique prefix has been stripped or not. This means its job ticket will be cleaned up after some time. If your workflow configuration assumes handing over jobs between flows (like described in the section on *unique name prefixes*), please, make sure the time difference between the moment a job reaches the end of the previous flow and the moment the job is picked up by the next flow is less than the value of this preference.
Keep log messages for (hours)	The time period (in hours) after which log messages will be deleted.
Run cleanup starting at (hh:mm)	The time offset from midnight at which to run the cleanup process for application data.
Run cleanup every (hours)	The period or frequency with which to run the cleanup process for application data.

4.1.11. Switch preferences: Logging

These preferences allow you to configure the way (log) messages are handled in Switch.

For more information about the log messages, refer to *The Messages overview* on page 310.

Property	Description
Log to CSV file	If set to **Yes**, all execution log messages are written to a CSV file in addition to the regular log database. A new log file is created when the size of the log file has reached 2.5 MB. The name of the log file includes the date and the time (YYYYMM-DDHHmmss). **Note:** Enable this option only on request of the Enfocus technical support team or if you're debugging a script that issues debug messages. *The following options are only available if **Log to CSV file** is set to **Yes**.*
	CSV file delimiter The delimiter separating the records in the generated CSV log file, for example a comma or a semicolon.

Property	Description
	Log files folder Folder where the CSV log files will be stored. If set to **Default**, the log files are stored in the "Logs" folder of the Application data root (see *Switch preferences: Application data* on page 45).
Log debug messages	If set to **Yes**, assert and debug messages are logged. They are shown in the Messages overview and written to a CSV file. If set to **No**, the assert and debug messages are discarded. **Note:** Enable this option only on request of the Enfocus technical support team or if you're debugging a script that issues debug messages. Refer to *The Messages overview* on page 310.
Log FTP interaction	If set to **Yes**, problems with **failed** FTP transfers are logged and saved in: • FtpSendTrace.log for FTP send • FtpWatchFolderTrace.log and FtpReceiveTrace.Log for FTP receive These files can be found in the logs folder of the Switch Application Data Root (as set in the *Application data preferences*). *The following option is only available if **Log FTP interaction** is set to **Yes**.*
	Clean the log when flow is activated If set to **Yes**, the FTP interaction logs will be deleted when the flow is activated. **Note:** When logs are stored for a long time, Switch may become slow and sometimes non-responsive. Therefore, we recommend clearing logs regularly.

4.1.12. Switch preferences: Flows backup

When upgrading to a new version of Switch, the existing flows are updated automatically to that version. That's also the case, when you're installing a new version of an app or a configurator: in that case, the flows in which the updated app or configurator are used, are updated as well.

The preferences in this category allow you to make an automatic safety backup (at a location of your choice) before updating the flows.

Property	Description
Flows backup folder	By default, this is a subfolder ('Backup ') of the application data root, but you can choose a different location as required. The flows are placed in a subfolder that refers to the date and time of the export.
Backup flows before updating	When set to **Yes**, a backup is made whenever an upgrade takes place. **Note:** Group information is not preserved. The flows are saved as separate flow files (*.sflow).

4.1.13. Switch preferences: Internal communication

These preferences configure advanced settings related to the communication between Switch application components. Do not change these settings unless you understand why you need to change them.

Note: The ports in the range 0 to 1023 are often managed by the IANA and should only be used by privileged users.

Property	Description
Switch Server name	The name of this instance of the Switch Server. This name will be shown in the legacy version of SwitchClient. It is also used in the title bar of the application and in the file name of exported logs. **Note:** Changing the server name requires a restart of Switch.
Port for Switch Designer	The port used for communication between Switch Server and Switch Designer, in the range of 1 to 65535.
Port for Watchdog - Switch Server	The port used for communication between Switch Server and Switch Watchdog, in the range of 1 to 65535.
Port for Watchdog	The port used for communication between Switch Designer and Switch Watchdog, in the range of 1 to 65535.
Job client type	Type of client used to submit and check jobs: • **Default**: Job submission is enabled from within the Switch Web Portal and through the new Switch Web Services (REST API) • **Legacy**: Job submission is enabled through the legacy SwitchClient (desktop application) or legacy Switch Web Services (SOAP API).

Property	Description
	Note: • Changing this preference requires a restart of Switch Server and Designer. • 'Legacy' is the default value for users that upgraded from a previous Switch version; in other cases, 'Default' is the default value. *The following options are only available if **Job client type = legacy**.*
Compress SwitchClient jobs	• **Yes** (default): Jobs transferred from and to SwitchClient instances are compressed (resulting in higher processing time and lower bandwidth consumption). • **No**: Jobs are not compressed (resulting in lower processing time and higher bandwidth consumption); this option is meaningful for high-speed local networks.
Port for SwitchClient	Port to be used for the communication between Switch Server and SwitchClient instances.

Note: If you want to set a firewall rule to allow all network communication (like the Switch Web Portal, the legacy SwitchClient, FTP ...), you need to set an exception for the Switch Service process instead of the Switch Designer process, because network communication for Switch happens through this process. For more information on which ports should be used, check the above table.

4.1.14. Switch preferences: ODBC data sources

This section of the Preferences dialog is only relevant if you have an active license for the *Databases module*.

It allows you to configure the ODBC database connection you want to use with Switch.

Property	Description
ODBC data source information	Click ... to set up the database connections. See *Setting up an ODBC database connection* on page 52.

4.1.14.1. About ODBC data sources in Switch

Guidelines

Please take into account the following guidelines when accessing ODBC data sources in Switch:

Before you set up the connection to the data source, you should have defined your database (i.e. the Database Source Name (DSN)) in the **DSN settings of your operating system**. Read the documentation of your database to learn how to set up the DSN.

Windows users can find more information on the Microsoft website: *http://msdn.microsoft.com/en-us/library/ms710252%28v=VS.85%29.aspx*

Mac users should install an ODBC Administrator, for example *http://www.odbcmanager.net/*, to be able to set up ODBC connections on Mac.

Note: Switch allows you to use both User and System DSN on Windows and Mac platforms.

Make sure to install a 64-bit ODBC driver.

- **Example Windows OS:** In case of MySQL database, the ODBC driver installer mysql-connector-odbc-5.1.8-winx64.msi is used. When you launch this installer and choose the **Custom** installation, you will see that two drivers are available: 32-bit and 64-bit. Install the 64-bit driver and preferably disable the 32-bit driver, to avoid mix-up of driver versions in the future. This will guarantee that Switch uses the correct driver.

For more information on ODBC drivers and data sources, refer to *http://msdn.microsoft.com/en-us/library/ms710285%28v=VS.85%29.aspx* .

- **Example Mac OS X:** In the MySQL database, two versions of Mac OS X ODBC drivers are available: 32-bit and 64-bit. You must use the 64-bit version (mysql-connector-odbc-5.2.7-osx10.7-x86-64bit.dmg).

Make sure to use the 64-bit version of the ODBC Administrator tool to configure your data sources (DSNs).

On 64-bit Windows computers, two ODBC Administrator tools are available:

- 32-bit version: ..\windows\sysWOW64\odbcad32.exe
- 64-bit version: ..\windows\system32\odbcad32.exe

Use the 64-bit version from \windows\system32\odbcad32.exe to configure your DSNs for Switch.

- If you install only the 64-bit ODBC driver and then launch the 32-bit version of the tool, you will not be able to configure any DSNs, because the 32-bit version of the tool does not show the 64-bit ODBC drivers.
- If you have installed the 32-bit ODBC drivers, then in the 32-bit version of the tool you will see the 32-bit driver and you will be able to configure DSNs for that driver. However, Switch will not work with these DSNs and you will get the error message The specified DSN contains an architecture mismatch between the Driver and Application".

For more information on managing data sources, refer to *http://msdn.microsoft.com/en-us/library/ms712362%28v=VS.85%29.aspx* .

Using the INGRES database in combination with Switch?

You should set the following flag (in the INGRES database):

```
return NULL for SCHEMA columns in ODBC catalog function result sets
```

Otherwise, you will get an error ("invalid table") when setting up SQL statements.

4.1.14.2. Setting up an ODBC database connection

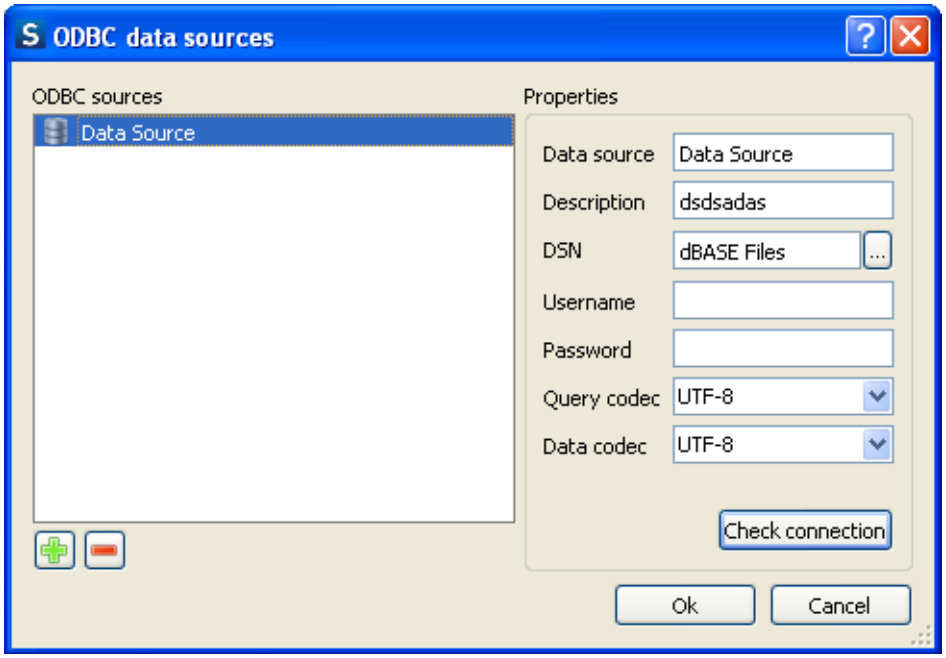
If you want to use Switch with an ODBC data source (and you have licensed the Database module), you must set up a connection to the preferred database.

Note: If you have more than one database, you can configure different database connections as required.

To configure an ODBC database connection

1. In Switch, navigate to **Edit** > **User Preferences** > **ODBC data sources**.
2. Do one of the following:
   - Select the **ODBC data source information** field and click ...
   - Double-click the **ODBC data source information** field.

   The ODBC data sources dialog appears.
3. To add and configure an ODBC data source, click .
   The ODBC sources field now contains one data source, temporarily called *Data Source*. You can rename it in the next step of this procedure.



4. In the **Properties** pane, in the **Data Source** text field, provide a name for the data source.
5. In the **Description** text field, provide a small definition for the data source.

6. To select the DSN (Database Source Name) from the library, click ...

   The DSN must be defined in the DSN settings of your operating system. For more information, refer to *About ODBC data sources in Switch* on page 50.

7. Provide a **Username** and **Password**.

   These two fields can also be left blank if username and password are not required, or if they have already been defined for the DSN.

8. From the drop-down menus, select the appropriate **Query codec** and **Data codec**, if required.

9. To test the database connection, click **Check connection**.
   If the connection succeeded, a message box appears displaying the message Connection successful.

   Note: In case of problems, you will see an error message generated by the ODBC tool of your operating system.

10. To close the message, click **OK**.

    If you have more than one database, repeat step 3 to 10 and add as many data sources as you have databases.

11. To close the **ODBC data sources** dialog, click **OK** once more.

4.1.15. Switch preferences: Remount volumes

Note: **Remount volumes** is available only when Switch Server is running on Mac OS X.

The backing folders used by flow elements may be located on mounted volumes. On Mac OSX, if the network connection is interrupted, Switch automatically remounts the volumes that are used by the elements in active flows. By default, when remounting, Switch uses the volume information from the backing folder path. However it is also possible to define the additional remount information in the Switch preferences.

Property	Description
Volume remount information	List of volume paths with corresponding user name and password. The specified user name and password is used to mount these volumes. To edit the volume remount information, double-click the property. See *Setting up remount volume information* on page 54.

Property editor

This preference uses a new property editor which offers the following three columns:

Column header	Description
Volume path	The complete network path identifying a volume that may have to be remounted by Switch.
User name	The user name to be used for remounting the volume (required field).
Password	The password to be used for remounting the volume.

Leaving the user name empty is equivalent to not listing the volume at all. When user closes the property editor all items with empty user names are automatically removed. This is relevant to the suggestion feature described in the next section.

Show volume paths used by active flows

When editing the Volume list, the **Show volume paths used by active flows** can be used to list all volume paths currently in use by active flows at the end of the list. By default this checkbox is turned on. Its state is remembered between uses of the property editor and across Switch sessions. If the volume path contains a user name, this will be entered in the User name field. The password is NOT added automatically.

When turning the option off, all volume paths with an empty user name will be removed from the list.

4.1.15.1. Setting up remount volume information

If your Switch is running on Mac OS X, you can make sure that volumes will be remounted if the network connection is interrupted.

To configure remount volume information

1. In Switch, navigate to **Edit** > **User Preferences** > **Remount volumes**.
2. Do one of the following:
   - Select the **Volume remount information** field and click ...
   - Double-click the **Volume remount information** field.

   The property editor appears.
3. Enter the following details:
   - **Volume path**: The complete network path identifying a volume that may have to be remounted by Switch.
   - **User name**: The user name to be used for remounting the volume (required field).

     Note: Do not leave the user name empty! When closing the dialog, volumes without a user name are automatically removed if **Show volume paths used by active flows** is disabled (see step 4 of this procedure).
   - **Password**: The password to be used for remounting the volume.

4. Select or clear the **Show volume paths used by active flows** checkbox as required:
   - If selected (default value), all volume paths currently in used by active flows will be added to the list of volumes to be remounted. If the volume path contains a user name, it is added automatically as well, but this is NOT the case for the password. You must add the password manually.
   - If cleared, all volume paths with an empty user name will be removed from the list.

     Note that the state of this checkbox (enabled/disabled) is remembered between uses of the property editor and across Switch sessions.
5. Click **OK**.

4.1.16. Switch preferences: Active Directory settings

Active Directory Settings are only relevant if you want to use your existing Active Directory user accounts to define access rights for the Switch Web Portal and/or Remote Designer. For more information, refer to *Setting up Switch users* on page 59.

Double-clicking **Active Directory information**, displays a dialog with the following fields:

Property	Description
Server address	Address of the Active Directory server. Example: SERVER001.enfocus.com
Server port	Port number of the Active Directory server. Example: 389
Secure connection	If selected, Switch will set up a secure TLS/SSL connection to the Active Directory server. Remark: • If server port 636 is used, the SSL negotiation will start immediately after the connection has been established. • If a different port is used, Switch connects in plain text to the AD server, then explicitly starts the SSL negotiation through the StartLS command.
LDAP version	The version of the LDAP protocol used on your Active Directory server. Example: 2 or 3 (default)
Base DN	Distinguished name to be used as the search base. Example: Usually, users and user groups are located under the domain name. If users are stored in the folder enfocus.com, the base DN is: `DC=enfocus;DC=com`. **Note:** If you don't know the base DN, you can leave it empty. Once you have executed an AD directory query, it will be filled in automatically.

Property	Description
Use pre-Windows 2000 logins	This option defines how user names are generated when Active Directory users are added in the Users pane: • When selected, the name of an Active Directory user added in the Users pane will have the format "domain\user" (also known as pre-Windows 2000 domain name), e.g. Netbios\sAMAccountName. Make sure to also use this format for the user to be used to log on to the Active Directory server (next field). • When cleared, the name of an Active Directory user added in the Users pane will have the format "user@domain" (also known as the User Principal Name), e.g. user@example.com. Make sure to also use this format for the user to be used to log on to the Active Directory server (next field). **Note:** Changing this option has no impact on the users already present in the Users pane. However, if needed, you can manually adjust the User names in the Users pane.
User	User name to log on to the Active Directory server. If **Use pre-Windows 2000 logins** is selected, the required format is "domain\user", for example: enfocus\user1 If **Use pre-Windows 2000 logins** is cleared, the required format is "user@domain", for example: user1@enfocus.com
Password	Password to log on to the Active Directory server.

Note: To verify the connection to the Active Directory server, click the **Test connection** button.

4.1.17. Switch preferences: Web services

These preferences configure the settings related to the communication between Switch and its client applications.

Property	Description
Port for the Switch Web Service	The port used for communication between the Switch Web Service and a client application, in the range of 1 to 65535. Default value: 51088
Port for the Switch Web Portal	The port used for communication between the SwitchClient WebServer and a client application, in the range of 1 to 65535. Default value: 51089
Protocol	The protocol used for the communication between the Switch WebServer and the browser. Choices: • HTTP (default value) • HTTPS (secured, encryped communication for which you need a certificate)

Property	Description
	If set to **HTTPS**, the following additional fields appear: • *Certificate*: Path to the certificate file • *Private key*: Path to the private key file • *Password for private key* **Note:** If your browser does not recognize the used certificate, it will block the Log messages overview. In that case, you must add it as an exception in your browser settings.
Privacy policy page	URL (starting with "http" or "https") of the privacy policy of your company. This URL is used to make the privacy policy of your company available to users of the Switch Web Portal. *Example URL*: http://www.enfocus.com/en/privacy-policy/ If this property is empty, no privacy policy is displayed. **Note:** Changing this property requires a restart of Switch. A privacy policy contains the guidelines a company uses to protect the information provided by its customers. It's a legal requirement to have such a privacy policy if you're collecting data from your customers. As in Switch the language preference of the users is stored (using cookies) when they launch messages in a web browser, we recommend entering the link to your privacy policy. The privacy policy is made available as follows: • On the login page of the Switch Web Portal, there's a 'Privacy policy' button; when a user clicks this button, the web page concerned is displayed. • Once signed in to the Switch Web Portal, the Info menu in the bottom left corner gives access to the Privacy policy.

4.1.18. Switch preferences: Reporting

These preferences relate to the Dashboard Service that enables the creation of dashboards and job boards on the Switch Web Portal.

Property	Description
Dashboard Service location	Indicates where the Dashboard Service was installed. • **Local** (default): The Dashboard Service was installed on the same system as the Switch Server. • **Remote**: The Dashboard Service was installed on a different system (for example to avoid overload of the server), so the connection between Switch and the Dashboard Service is remote. If this option is chosen, the following additional properties appear:

Property	Description
	• **Address**: IP address of the system on which the Dashboard Service was installed. • **Port**: Port used for the communication between the Switch Server and the Dashboard Service. Default value: 55092
Keep historical data for (days)	Indicates how long historical data (= data about jobs that left a flow) should be kept. During this period of time, the historical data can be used in history graphs in dashboards on the Switch Web Portal. The default value is 120 days. This preference is only available if the Reporting Module is licensed.

Note: To verify the connection to the Dashboard Service, click the **Test connection** button.

4.1.19. Switch preferences: Webhooks

These preferences relate to the webhooks, a mechanism that allows external applications to request information from Switch.

Property	Description
Enable HTTP listener	If set to **Yes**, Switch accepts requests from external applications/third-party services via HTTP. This triggers a new property: • **Port for HTTP listener**: Port used for the communication between the Switch HTTP listener and the third-party service. The default value is *51080*.
Enable HTTPS listener	If set to **Yes**, Switch accepts requests from external applications/third-party services via HTTPS (secured, encryped communication for which you need a certificate). This triggers the following extra properties: • **Port for HTTPS listener**: Port used for the communication between the Switch HTTPS listener and the third-party service. The default value is *51081*. • **Certificate**: Path to the certificate file. • **Private key**: Path to the private key file. • **Password for private key**
Requests delivery timeout (in minutes)	Indicates how long (in minutes) a request that is not received remains valid. After this period of time, the request is removed.

4.2. Configuring Switch users

When do you need to set up users?

Switch user configuration is only relevant if you want to allow users to:

- Submit or check jobs using **Submit points and Checkpoints** (which requires a SwitchClient license).
- View log messages through the **Switch Web Portal**.
- View and/or create job boards and dashboards on the **Switch Web Portal**.
- Launch Switch Server using **Remote Designer**.

Procedure

1. *Set up the users and/or groups* that should get access.
2. *Assign access to particular Submit and Checkpoints* (as required).

4.2.1. Setting up Switch users

How does it work?

If a user connects to the Switch Server through the Switch Web Portal, through the legacy SwitchClient, or through Remote Designer, he must enter a user name and a password. The user name identifies the user to the server and grants him access based on his permissions. For example, if a Remote Designer user has read-only access, he will be able to view all flows and settings, but he will not be able to change anything.

Users or groups?

If several users should have the same permissions (for example because they have the same role), you may consider to group them and define their (access) rights at group (or "role") level. This will save you time if something changes. For example, if a new employee with a particular role enters the company, you can simply add the new user to the appropriate group.

Example:

- Group 1: Administrators having access to all Submit points and Checkpoints. Only this group has full access to Remote Designer.
- Group 2: Operators having access to all Submit points and Checkpoints, but with limited access to Remote Designer.
- Group 3: Customers having access to particular Submit points and Checkpoints (so they can only see their own jobs), but with no access to Remote Designer.

With this setup, you have to configure the permissions and access rights only three times, instead of e.g. x times (with x being the number of users).

Groups are also required if you want to allow users to share their job boards and dashboards on the Switch Web Portal. Sharing of boards is only possible among group members.

Note: In case of conflicting permissions, the highest permission level is taken into account. For example, if a user has no access to Remote Designer, but the group(s) he belongs to does have access, he will have access as well.

If you have configured a group, you can define a **group manager** for that group. Group managers can view jobs of their group members, whereas regular group members can only see their own jobs (unless otherwise configured).

How to configure users?

There are different ways to set up users:

- You can create *new users* and *groups* in Switch.
- You can *import users and groups* that you exported from a previous Switch version or from a Switch copy installed on another computer.
- You can *import existing Active Directory users and user groups from your Active Directory domain*.

4.2.1.1. Configuring a user

Note: You can set up new users and groups for use in Switch only, or you can re-use your Active Directory users and user groups. This topic explains how to set up users for use in Switch only.

To configure a user

1. In the toolbar at the top of the application, click the **Users** button .
2. Under **Users & Groups**, select the **Users** category Users.
3. Click the **Add user** button at the bottom of the pane.
   A new user (**New User <number>**) is added to the Users category.
4. Enter the required details:
   - User name
   - Full name
   - Password
   - Email address. The email address is used to send messages to users (if configured as such in a flow).
5. If the user belongs to a group, proceed as follows:
   a. Click the plus icon at the bottom of the **Member of** field.
   b. Select the group(s) the user belongs to.
      To select several user groups in one go, hold down the **Ctrl** key while selecting them.
   c. Click **OK**.

   To remove groups from the list as required (for example if you made a mistake, or if the user does no longer belong to the group), select the group(s) concerned and click the minus icon .
6. Assign the appropriate permissions for the **Switch Web Portal**:

- *In case of an active SwitchClient license*, to allow the user to submit and check jobs through the Switch Web Portal, select the **Submit and check jobs** checkbox and determine which jobs the user is allowed to handle:
  - **All jobs** (also the ones submitted by other users)
  - **Own jobs** (only the ones submitted by the user) or **Own jobs and group members' jobs** (this option is only available for group managers)

  Note that this only applies to jobs in Checkpoints the user has access to.
- To allow the user to view error messages through the Web Portal, select the **View messages** checkbox.
- To configure the permissions for **boards** on the Web Portal, select the appropriate option:
  - To allow the user to view and create dashboards, select **Full access**.
  - To allow the user to only view shared boards, but not create them themselves, select **Read-only**.
  - To hide all boards from the user, select **No access**.

7. Configure the appropriate permissions for **Remote Designer** (as required):

- To grant the user the same permissions as if he were working locally, select **Full access**.
- To allow the user to only view data, but not change them, select **Read-only**.
- To not allow the user to launch Switch using Remote Designer, select **No access**.

If the user has the right to submit and check jobs (step 6), next thing to do is: *assign access to particular Submit and Checkpoints.*

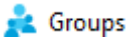
4.2.1.2. Configuring a user group

Note:

- You can set up new users and groups for use in Switch only, or you can re-use your Active Directory users and user groups. This topic explains how to set up groups for use in Switch only.
- The Administrators group is available by default and cannot be removed. Members of this group have full access to the Switch Web Portal and to Remote Designer. Do not forget to add users to this group (see step 6 of this procedure). Note that administrators can unlock jobs of all users on the Switch Server.

To configure Switch user groups

1. In the toolbar at the top of the application, click the **Users** button.

2. Under **Users & Groups**, select the Groups category. 

3. Click the **Add user group** button at the bottom of the pane.
A new user group (**New Group <number>**) is added to the Groups category.

4. Enter the group name.
5. Select the group manager(s) (as required):
   a. Click ⊕ at the bottom of the Group manager field.
   b. Select the user(s) that need(s) group manager rights.
      To select several user groups in one go, hold down the **Ctrl** key while selecting them.
   c. Click **OK**.

   Tip: Alternatively, you can select a member in the Group members field and drag it to the Group manager field.

   - Group managers have more rights than the other group members. They can for example unlock the jobs of their group members (in addition to their own jobs) on the Web Portal.
   - To remove users from the Group manager list as required, select the user(s) concerned and click ⊖.
6. To select the group members that belong to the group
   a. Click ⊕ at the bottom of the Group members field.
   b. Select the user(s) belonging to the group.
      To select several users in one go, hold down the **Ctrl** key while selecting them.
   c. Click **OK**.

   To remove users from the list (for example, if you made a mistake), select the user(s) concerned and click ⊖.
7. Assign the appropriate permissions for the **Switch Web Portal**:
   - *In case of an active SwitchClient license*, to allow the users of the group to submit and check jobs through the Switch Web Portal, select the **Submit and check jobs** checkbox and determine which jobs the group members are allowed to handle:
     - **All jobs** (the user's jobs and the jobs of other users, not limited to the other group members' jobs)
     - **Own jobs** (the users of this group can only see their own jobs, the group manager can see all the jobs of the group he belongs to)

     Note that this only applies to jobs in Checkpoints the user has access to.
   - To allow the members of this group to view error messages through the Web Portal, select the **View messages** checkbox.
   - To configure the group permissions with regard to **boards** on the Web Portal, select the appropriate option:
     - To allow the users of the group to view and create dashboards, select **Full access**.
     - To allow the users of the group to only view shared boards, but not create them themselves, select **Read-only**.
     - To hide all boards from the user of the group, select **No access**.
8. Determine whether or not the members of this user group are allowed to launch Switch using Remote Designer:

- To grant the users the same permissions as if they were working locally, select **Full access**.
- To allow the users to only view data, but not to change them, select **Read only**.
- To not allow the user to launch Switch remotely, select **No access**.

If the group members have the right to submit and check jobs (step 7), next thing to do is: assign access to particular Submit and Checkpoints.

4.2.1.3. Importing users and user groups from Active Directory

An Active Directory domain controller manages and authenticates all users in a company network. If you import Active Directory users and user groups in Switch, the user names and passwords used in Switch will be checked against your Active Directory server and not against the local Switch user database. As a consequence, users can use the name and password they use to log in on their work computers.

Note: You must have configured your Active Directory settings (such as server address, user name and password) in the User Preferences pane. For more information, refer to *Switch preferences: Active Directory settings* on page 55.

To import users and user groups from LDAP directory

1. In the toolbar at the top of the application, click the **Users** button. .
2. In the Users pane, click the **Select AD user or group** button at the bottom of the pane.
3. In the dialog that pops up, enter (part of) the AD (user) name or email address.

   Note: The search function is case-insensitive.

4. Click **Search**.
5. Select the user or user group you want to use in Switch.

   Tip: You can sort the search results alphabetically, by clicking the column headers.

6. Click **OK**.
   - If you selected an Active Directory group, the group name and the group members are displayed in the Groups category in the Switch Users pane. Subgroups (if any) are not preserved; all users are presented in one flat list.
   - If you selected an Active Directory user, the user name, full name and email address are displayed in the Users category in the Switch Users pane. Note that these details are read-only.
7. If you selected an Active Directory user, you can optionally add the user to an existing group:
   a. Click ⊕ at the bottom of the Member of field.
   b. Select the group(s) the user belongs to.

To select several user groups in one go, hold down the **Ctrl** key while selecting them.

c. Click **OK**.

To remove user groups from the list as required, select the group(s) concerned and click ⊖.

8. If you selected an Active Directory user group, you can select a group manager (as required):

   a. Click ⊕ at the bottom of the Group manager field.

   b. Select the user(s) that need(s) group manager rights.

   To select several user groups in one go, hold down the **Ctrl** key while selecting them.

   c. Click **OK**.

   Tip: Alternatively, you can select a member in the Group members field and drag it to the Group manager field.

   - Group managers have more permissions than the regular group members. Refer to step 9 of this procedure.
   - To remove users from the Group manager list as required, select the user(s) concerned and click ⊖.

9. Assign the appropriate permissions for the **Switch Web Portal**:

   - *In case of an active SwitchClient license*, to allow the users (or the members of the user group) to submit and check jobs through the Switch Web Portal, select the **Submit and check jobs** checkbox and determine which jobs the users are allowed to handle:
     - **All jobs**
     - **Own jobs** (users can see their own jobs; if they are a group manager, they can also see the jobs of the other group members)

     Note that this only applies to jobs in Checkpoints the group or the user has access to.
   - To allow the users (or members of this user group) to view error messages through the Web Portal, select the **View messages** checkbox.
   - To configure the permissions for **boards** on the Web Portal, select the appropriate option:
     - To allow the users (or members of this group) to view and create dashboards, select **Full access**.
     - To allow the user (or members of this group) to only view shared boards, but not create them themselves, select **Read-only**.
     - To hide all boards from the users (or members of this group), select **No access**.

10. Determine whether or not the users (or members of a user group) are allowed to launch Switch using Remote Designer:

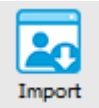
    - To grant the user the same permissions as if he were working locally, select **Full access**.
    - To allow the user to only view data, but not to change them, select **Read only**.

- To not allow the user to launch Switch using Remote Designer, select **No access**.

4.2.1.4. Importing users and user groups

If you have installed different copies of Switch, it can be useful to export the user information from one copy and import it into the other. This topic describes how to import user information.

To import users and user groups

1. In the toolbar at the top of the application, click the **Import** button. 

2. In the **Import users and groups** dialog, select the user information file exported from Switch.

   This can be a text file or an XML file.

3. Click **Open**.

   In case of conflicts (for example if a user already exists in Switch), a warning is displayed. You are asked which user (or user group) you want to keep (i.e. the imported user or the one that already exists in Switch).

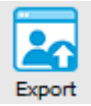
   The imported users and user groups are displayed in the **Users and Groups** panel in Switch.

> **Note:** When you're importing Switch 18 /18 update 1 users or user groups, all users that had the right to create boards will have full access to boards in later Switch versions. Users that did not have the right to create boards, will have no access. You can change this setting manually if required.

4.2.1.5. Exporting users and user groups

If you have installed different copies of Switch, it can be useful to export the user information from one copy and import it into the other. This topic describes how to export user information.

To export users and user groups

1. In the toolbar at the top of the application, click the **Export** button. 

2. In the **Export users and groups** dialog, type a name for the exported file.

3. Select the preferred file type:

   - To save the exported file as an XML file, select: **Switch users and groups (*.xml)**.
   - To save the exported file as a text file, select **Switch users and groups (*.txt)**.

4. Click **Save**.

4.2.2. Assigning access rights

If you have designed flows with Submit points and Checkpoints, you can indicate who has the right to use them. This is done in the right part of the Users pane.

What users can do in Submit and Checkpoints depends on:

- The permissions assigned to the group they belong to (if applicable)
- Their permissions on user level (View messages/Submit and check jobs).
- Their role in the group (group manager or regular group member). For example, group members can see, edit, route and unlock other group members' jobs, whereas regular group members can only do this for their own jobs (unless otherwise configured).

4.2.2.1. Assigning access to Submit points and Checkpoints

For each Submit point and Checkpoint used in your Switch flows, you can define which users or user groups have the right to access it.

To assign access to Submit points and Checkpoints

1. In the toolbar at the top of the application, click the **Users** button.
   In the right part of the Users pane, under **Submit points**, all flow groups and flows with a Submit point configured in Switch are shown. Under **Checkpoints**, flow groups and flows with a Checkpoint are shown.

2. To assign access to one or more Submit points, under **Submit points**, select:
   - **All**, to give access to all Submit points in all flows on the Server.
   - A flow group ( ), to give access to all underlying Submit points (i.e. all Submit points configured for all flows in the selected group).
   - A flow ( ), to give access to all Submit points configured for that flow.
   - A Submit point ( ), to give access to this particular Submit point.

   Note: The users or groups that have access to the selected level are listed on the right; users for whom the access has been set on a higher level (e.g. on group level iso flow level) are also shown but grayed out. Note that you must select the correct level to remove a user or user group.

3. Click .

   Note: Alternatively, if (earlier selected) users or groups are listed in the right part of the panel, you can simply select them and drag and drop them (one by one) to the appropriate Submit point.

4. Select the appropriate user or group.
5. Click **OK**.
   The name of the selected user or group is shown.
6. Proceed in the same to way to give access to Checkpoints .

4.3. Running Switch Watchdog as a service

Note: This section is only relevant if your operating system is Microsoft Windows.

4.3.1. Switch Server and Switch Watchdog

Switch offers its functionality through a number of separate applications. See *Switch application components* on page 10.

The Switch Server runs in the background (without user interface) to execute flows, monitored and managed by the Switch Watchdog. In normal circumstances it is automatically started and terminated as needed by the Switch Designer.

4.3.2. Setting up Switch Watchdog as a Windows service

On Microsoft Windows, the Switch Watchdog can be operated as a Windows service. This allows Switch to continue processing after you have logged off from the computer. In addition, you can specify that Switch should be restarted automatically after a system failure. Running the Switch Watchdog as a Windows Service will also restart Switch when it quit unexpectedly.

Note: Are you using third-party configurators in Switch? In that case it is **not** recommended to set up Switch Watchdog as a Windows service. Most third-party and desktop applications do not support this. Refer to *Switch Service not compatible with (configurators for) desktop applications* on page 69.

To set up Switch Watchdog as a Windows service, proceed as follows:

1. In Switch, navigate to **Edit** > **Preferences** > **User Interface** and configure the following preferences:
   - **Start Switch Server automatically at login** = No
   - **When exiting the flow designer** = Ensure processing is started.

   This avoids that Switch is started when a user logs in to Windows. For more information, refer to *Switch preferences: User interface* on page 34.
2. In the Windows operating system, navigate to **Start** > **Control Panel** > **Administrative Tools** > **Services**.

   If necessary, switch to "Classic View".
3. In the list of services, locate **Enfocus Switch Watchdog**.

4. Right-click this service and choose **Properties**.
5. On the **General** tab, choose the startup type you prefer:
   - **Automatic** will make sure the service is started when booting your computer.

     (Note that **configuring this setting** does not start the service; Switch Watchdog will start as soon as you reboot your computer.)

   - **Manual** means you will have to start the service explicitly from this dialog box.
6. On the **Log On** tab, enter the information for the user account that should be used to run the service.

   This allows Switch to get access to information saved in a specific user's preferences (such as Photoshop actions) and to use Switch data stored in the application data root (which is linked to a specific user and looks like this: C:\Users**<user>**\AppData\Roaming\Enfocus \Switch Server). If you want to keep using the same application data, after switching to Windows service mode, make sure to use the same user.

   Also, if Switch should get access to the network (e.g. to save files), make sure the chosen user has the appropriate access rights.
7. Back on the **General** tab, click the **Start** button to launch the Switch Watchdog as a service.

Note: When shutting down or rebooting the operating system, the operating system will wait for maximum 30 minutes before terminating the Switch Watchdog service and all its child processes. Therefore, to make sure that the Switch Watchdog service is able to shut down gracefully, we advise stopping all flows before shutting down or rebooting the operating system.

4.3.3. Operating Switch as a Windows service

After you install the Switch Watchdog as a service in the installer, the Server need not to be installed as a service anymore.

At startup, the Designer checks if the watchdog is running. If the Watchdog is not running, the Designer starts the Watchdog as a background application. The Watchdog starts the Server almost immediately and the Designer connects to the Server.

Be careful though:

- When you quit the Switch Designer, you will be asked whether you want the server to keep running. If you choose **No**, the server will terminate.
- The Switch Designer next sends a message to the Switch Watchdog to quit.

4.3.4. Switch service and mapped drives

Microsoft Windows allows assigning a drive letter to a network computer or folder, creating a **mapped drive**. A mapped drive letter (such as Z) can be used in a file or folder path just like a local drive letter (such as C). But there is a catch: the drive mappings are established when a user logs in to the system - and a service is not logged in (even if it is associated with a user account).

Thus while Switch Server is running without any user logged in, it cannot access mapped drives. You must ensure that all folders and file paths in the flow definitions are local drive paths or UNC paths (of the form \\server\volume\directory\file) rather than mapped drive paths. This holds for all paths including user-managed folders and references to files in configurator properties.

4.3.5. Switch Service not compatible with (configurators for) desktop applications

Configurators that communicate with a desktop application won't work when running Switch as Windows service. This is due to a Windows limitation. Desktop applications cannot be started by a Windows Service, hence their configurators cannot be used either.

Configurators concerned

- Adobe Photoshop
- Adobe Illustrator
- Adobe InDesign
- Adobe Acrobat Professional/Distiller
- Microsoft Office configurators (Microsoft Word, Microsoft Excel, Microsoft Powerpoint)

Some background information

Since the introduction of Windows Vista, Microsoft no longer allows applications that run as a Service to interact with the desktop. This means for example that these applications cannot show any UI to the user. As desktop applications cannot function with this limitation, their configurators do not work either.

Note: This problem does not affect Switch itself, because the Switch *Watchdog* (which has no UI) - and not the Switch Designer - is set up as a Windows Service.

Remark

If you want to use the configurators for desktop applications, you *must* run Switch as a regular process and not as a Windows service. However, in that case, you may want Switch to *start processing automatically* when a user logs in. To do so, ensure that the preference **Start Switch Server automatically at login** is set to **Yes** (See *Switch preferences: User interface* on page 34). Remember that a user has to log in in order to start Switch, which is not necessary when running Switch as a Windows service.

4.4. Setting up custom icons for job boards

Job boards can be created on the Switch Portal; these virtual boards enable users to view Switch jobs remotely. The jobs can be filtered by flow and/or job stage.

The jobs on the job boards are represented by an icon that refers to the file type of the job. For the most common file types Enfocus provides the standard icon. However, if you're working with different file types for which there is no icon yet, or if you prefer other icons, you can easily replace (some of) the standard icons with your own images.

The icons must be supplied as PNG files. The file name must refer to the file extension, for example psd.png (icon for Photoshop files), txt.png (icon to be used for text files), ... Best size is 128x128 (but the icons are scaled automatically).

To set up custom file type icons

1. On the system that runs the Switch Server, go to:
   - On Windows: AppData\Roaming\Enfocus\SwitchSite
   - On Mac: \Users\<user>\library\Application Support\Enfocus\SwitchSite\
2. Create a subfolder named 'icons'.
3. Copy the images to this folder.
4. Restart the Switch Server.

5. Working with Switch

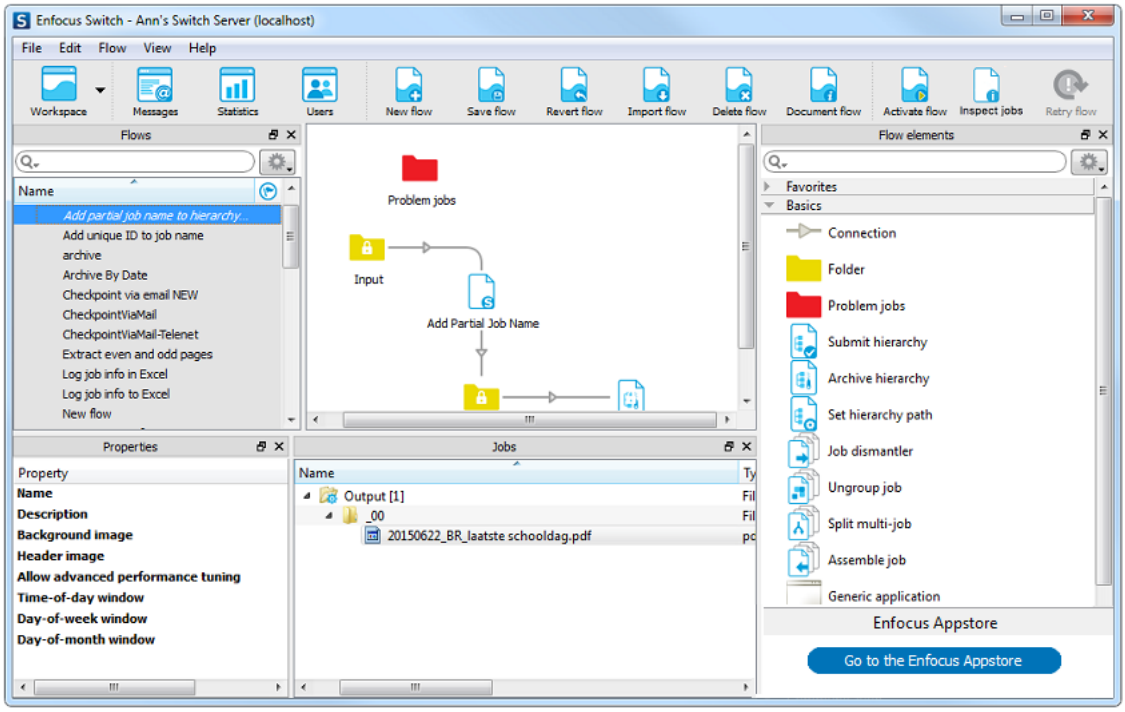
This section gives a detailed overview of the graphical interface of the application and explains how to use the different Switch modules.

5.1. Switch Graphical User Interface

This section gives a detailed overview of all elements of the Graphical User Interface.

5.1.1. Workspace overview

When the Switch Designer is launched, it displays the main window called the workspace, shown here in its default configuration (design view):



Toolbar

The toolbar is the strip at the top of the workspace offering a number of tool buttons.

See *Toolbar* on page 74 for more details.

Panes and views

The workspace contains a number of **panes** which can be manipulated as distinct entities (show, hide, resize, move, ...). Examples include the Flows pane, the Flow elements pane, and the Properties pane.

The central area that displays a flow design is called the **canvas**; it is a special pane because it has no title bar and it can't be moved from its central position.

One or more panes (optionally including the canvas) combine to make up a workspace configuration called a **view**. The currently displayed view is selected by pressing one of the buttons in the leftmost section of the toolbar.

Configuring the workspace

The workspace offers a number of panes that are displayed in a number of pre-configured views. Each of the views can be configured at will to display an arbitrary combination of panes. The contents of a pane persists across views (i.e. the different views display the same instance of the pane rather than different copies).

Panes can be shown or hidden by choosing the corresponding item in the **View** > **Show panes** menu. Panes can be resized by dragging the separators between them, they can be rearranged next to one another or overlaid as tabs by dragging their title bar, and they can be undocked as a floating pane. All configuration settings are persistent across sessions.

The currently displayed view can be returned to its pre-configured settings by selecting **View** > **Show panes** > **Reset view**.

Views

The Workspace offers the following views. The intended function is only a recommendation, since the user can re-configure the views at will.

Tool button	View name	Intended function
	Design	Design a flow
	Test	Test-run a flow
	Run	Run a flow in production
	Messages	View and export log messages

Tool button	View name	Intended function
	Statistics	View statistics
	Users	Manage users/groups and their access rights

Panes

The workspace offers the following panes, which can be combined at will in the different views.

Pane	Description
Dashboard	Displays status information on problem jobs or processes, as reported by the Switch Server
Flow elements	Lists the icons representing flow elements that can be dragged onto the canvas
Jobs	Serves to view and explore the contents of flow element backing folders (i.e. mostly jobs) Can also be used to view the contents of an arbitrary folder in the file system, but this is not a primary function
Flows	Lists all flows
Progress	Displays progress information for tasks currently being executed by the Switch Server
Properties	Displays the properties of the currently selected flow or flow element
Statistics	Displays statistics about job execution by the Switch Server
Statistics 2, 3	Extra statistics panes that may be configured to display a different set of statistics.
Client Activity	Allows monitoring SwitchClient connections. (only shown if *Job client type* is set to 'Legacy'; see *Switch preferences: Internal communication* on page 49.)

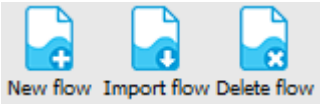
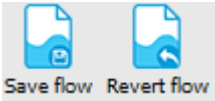
Pane	Description
Client Connections	Shows which SwitchClients are currently connected. (only shown if *Job client type* is set to 'Legacy'; see *Switch preferences: Internal communication* on page 49.)
Job Information	Displays the number of jobs waiting to be processed by each flow element.
Health Indicator	Monitors the internal communication processes within Switch.
Users pane	Allows managing user names, passwords and access rights

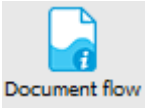
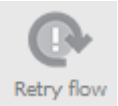
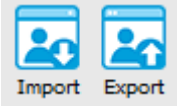
5.1.1.1. Toolbar

The toolbar is the strip located at the top of the workspace window; it contains a number of tool buttons to accomplish common tasks.

Tool sets

The tool buttons are grouped in tool sets, which are shown or hidden depending on which panes are currently shown or hidden. The following table provides an overview of the tool sets and their function.

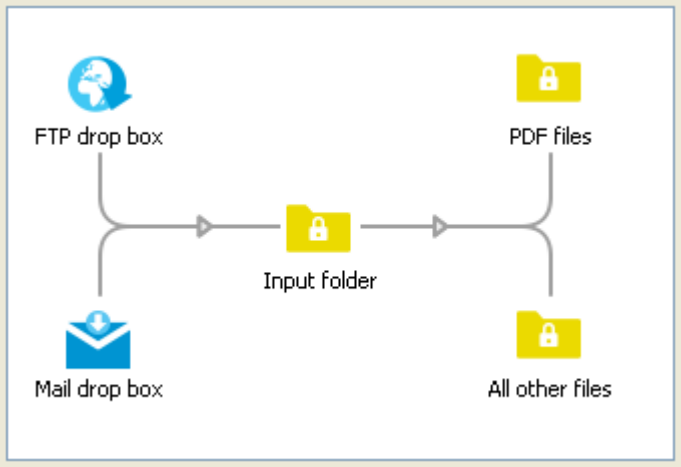
Tool set	Function
	• Always shown • Select a view (Workspace, Messages, Statistics, Users). See **Configuring the workspace** in *Workspace overview* on page 71
	• Shown with the Flows pane • New Flow, Import Flow, Delete Flow See *Importing and exporting flows* on page 275
	• New as of Switch 12 update 2 • Shown with the Canvas and Flows pane • Save Flow, Revert Flow See *Saving and reverting flows* on page 271

Tool set	Function
	• Shown with the Canvas and Flows pane • Activate Flow, Stop Flow See *Activating and deactivating flows* on page 273
	• New as of Switch 12 update 3 • Shown with the Canvas and Flows pane • Generate HTML documentation See *Generating flow documentation* on page 278.
	• Shown with the Canvas and Dashboard pane • Retry Flow, e.g. in case of a problem job or problem process. See *Viewing flow problems in the Dashboard pane* on page 289 and *Manual retry* on page 296
	• Shown with the *Users pane* on page 87 • Allows export and import of user information. See also *Setting up Switch users* on page 59, *Importing users and user groups* on page 65 and *Exporting users and user groups* on page 65.
	• Introduced in Switch 2018 • Allows to inspect metadata.

Tool set	Function
	See *Working with sample jobs* on page 390

5.1.1.2. Canvas

The canvas is the central workspace area that allows viewing and editing flows. Here's an example of a simple flow displayed in the canvas:



To display a flow in the canvas, select it in the Flows pane.

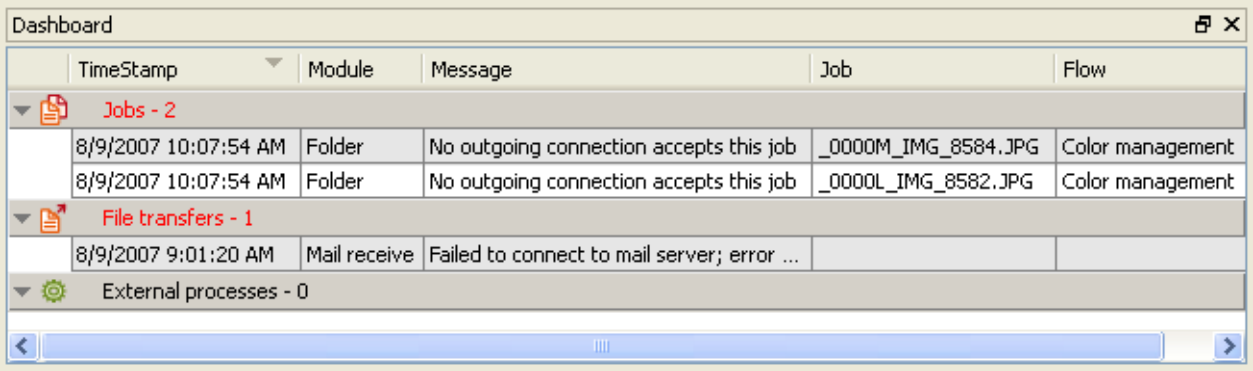
To make changes to a flow, ensure that it is inactive and unlocked.

You can also:

- drag new flow elements from the elements pane onto the canvas,
- create connections between flow elements,
- configure flow elements using the properties pane, and
- drag flow elements around to adjust the layout of the design.

5.1.1.3. Dashboard pane

The Dashboard pane gives an overview of problems found during flow execution. The information is updated dynamically: a problem item appears as soon as it is detected and disappears as soon as the problem is solved or handled.



For more information, refer to *Viewing flow problems in the Dashboard pane* on page 289.

5.1.1.4. Flow elements pane

The Flow elements pane lists the icons representing flow elements (such as folders, connections, tools, apps and configurators) that can be dragged onto the canvas and become part of a flow design.

Filtering

You can use the Search field on top to filter the flow elements. See *Filtering lists* on page 89

Favorites

The Favorites section can contain shortcuts to elements in other sections. It looks and functions like other section headers, but its content is managed by the user.

You can

- Select **Add to Favorites** from the context menu of a flow element to add a shortcut to the Favorites section.

  Note: Add to Favorites menu is disabled for flow elements, which have already been added to the Favorites section.

- Drag a flow element into the Favorites section to add a shortcut to the Favorites section.
- Select **Move up** or **Move down** from the context menu of a shortcut in the Favorites section, to change the order.
- Drag and drop shortcuts in the favorites section to change the order.
- Select **Remove from Favorites** from the context menu of a shortcut in the Favorites section, to remove it from the Favorites section.

Note: You can use keyboard shortcuts to add your favorite flow elements to the canvas. Just click ctrl+<number 1-9> (Windows) or cmd+<number 1-9> (Mac). The <number> refers to the position of the flow element in the Favorites category (first element = 1, second = 2, etc.).

Sections

The Flow elements pane groups the flow elements in sections. Click on a section header to open or close the sections, showing or hiding the flow elements in the section.

Section	Description
Basics	Basic flow elements that form the fabric of a flow design, including folder and connection
Tools	Built-in tools such as compress and rename, mostly for file handling
Scripting	Built-in tool for using script packages
Communication	Built-in tools for communication including email and FTP
Configurators	Configurators for third-party applications for processing jobs
Metadata	Built-in tools for working with metadata, including XML
Database	Built-in tools for using ODBC data sources
Apps	Small applications that can be used without a license for the Configurator module and made avavailable through the Enfocus Appstore. This category becomes available as soon as you have installed at least one app. See also *Working with apps in Switch* on page 299.

Flow elements

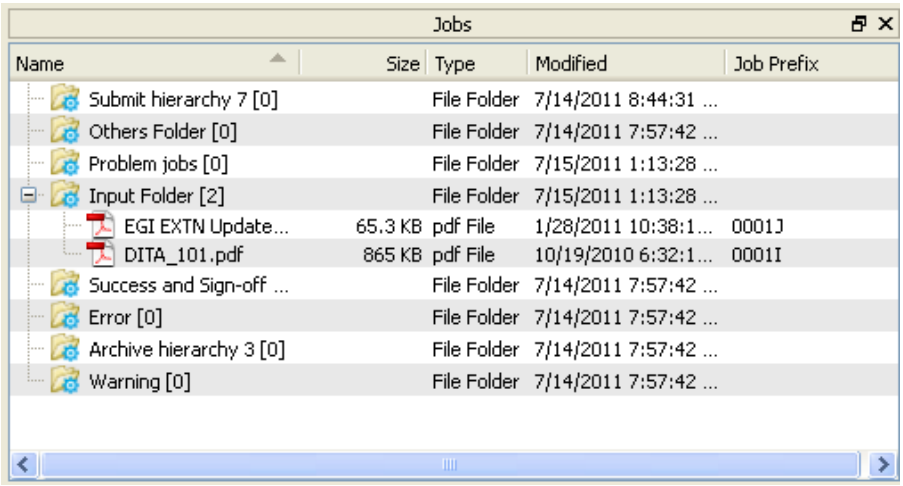
The list of flow elements displayed in the Flow elements pane depends on the Switch modules you have licensed. See the *Flow elements matrix* on page 208 for an overview.

Detailed information

Refer to: *Flow elements: overview* on page 92.

5.1.1.5. Jobs pane

The Jobs pane serves to view and explore the contents of flow element backing folders (that is, mostly jobs).



Use the Jobs pane to:

- View the contents of the backing folder for one of more flow elements by selecting the flow elements in the canvas.
- Drop files and folders in a flow using copy and paste or drag and drop.
- Delete files and folders by pressing the delete key or by choosing the **Delete** context menu item; deleted items are moved to the system's recycle bin.

Row types

Each row in the Jobs pane represents a file or folder as described in the following table. Folder rows offer a triangle button to show/hide the rows representing the contents of the folder.

Icon	Row represents	Information displayed
	The backing folder of a flow element	Flow element name and backing folder path
	A job folder	Folder info; Job info
	A job file	File info; Job info
	A regular folder	Folder info
	A regular file	File info

Jobs pane columns

The rows in the Jobs pane have multiple columns as listed in the following table. Individual columns can be shown or hidden through the "Show columns" context menu item. By default, only a subset of the columns is shown.

The visible columns can be resized and reordered by dragging. Clicking on a column header selects that column as the key for sorting the rows in the Jobs pane, and toggles between ascending and descending order. Rows that have the same parent (and thus are on the same hierarchical level in the tree) are sorted according to this specification. Root rows are always sorted on the name column (ascending or descending depending on the last setting).

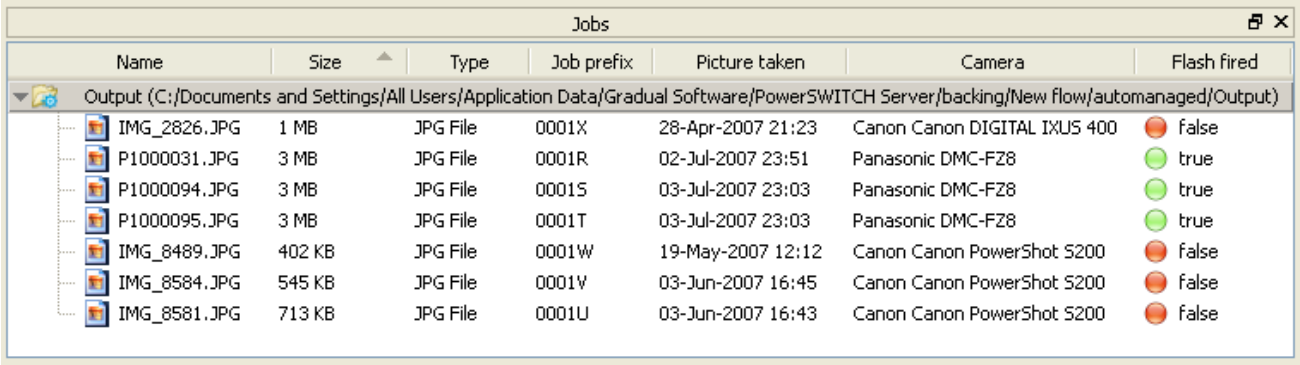
Column	Description
Name	Name of the file or folder represented by the row For a job file or folder the unique name prefix is removed

Column	Description
Size	The file size in bytes for job files and regular files; blank for folders
Type	The file type as retrieved from the operating system
Modified	The date/time the folder or file was last modified
Job Prefix	The unique name prefix for job files and job folders; blank otherwise This field is shown in red color if there is no corresponding valid internal job ticket (i.e. the job ticket doesn't exist or its file path doesn't point to this job)
The following columns are not shown by default	
Waiting since	The date/time the job arrived in this backing folder (more precisely, when it was detected by the server)
State	The name of the state currently attached to the job, or blank if there is none. A state can be attached to a job through the "Attach job state" property of the folder flow element; for more information, see *the Folder element* and *Viewing statistics* on page 291.
Entered state	The date/time the job entered the state currently attached to it, or blank if there is none. A state can be attached to a job through the "Attach job state" property of the folder flow element; for more information, see *the Folder element* and *Viewing statistics* on page 291.
Submit point	The name of the Submit point through which the job was submitted, or blank if it wasn't submitted through a Submit point
Submitted	The date/time the job was submitted through a Submit point, or blank if it wasn't submitted through a Submit point
User name	The name of the user associated with the job, or blank if there is none (a user is automatically associated with the job when it is submitted through a Submit point)
Custom 1 ... Custom 5	A user-configurable value calculated through variables or a script expression Both the column header and the column value can be configured through the context menu items "Set column header" and "Set column value (first make the column visible with the "Show columns" context menu item) Initially the values for these columns are blank

Example of custom columns

In the following example, two custom columns were configured to display the date when the picture was taken and the camera model (see defining text with variables).

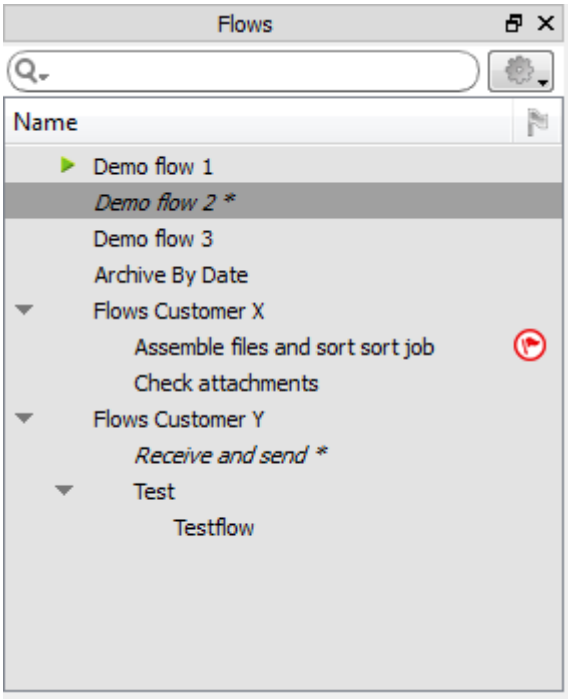
A third custom column was configured to display whether the flash fired when taking the picture (see defining a condition with variables).



5.1.1.6. Flows pane

The Flows pane lists all flows known to Switch at the present time. It allows you to organize these flows in a hierarchy of groups and subgroups, and provides a context menu for managing flows in various ways.

Note: If a flow is not saved yet, it is displayed in italics, followed by an asterisk.



Filtering

You can use the search field on top to filter the flows. See *Filtering lists* on page 89.

Actions

If you click the Actions icon ( ), a list appears with all the items that are available in the Flow menu on the menu bar.

Flows and groups

Each row in the flows pane represents a flow or a group. A group can contain flows and other groups, up to any nesting level. When you select a group, all the flows in the group (and in any subgroups) are automatically selected as well. You can open/close a group by clicking the arrow at the left. You can reorganize the order and nesting structure in the flows pane by dragging the rows.

When you select a flow in the flows pane, it is displayed in the canvas and you can see its properties in the properties pane.

When you select two or more flows in the flows pane, a scaled-down representation of all the selected flows is shown in the canvas. You can perform many operations (such as activate/deactive) on multiple flows at the same time; however you can't make changes to the flow design while two or more flows are selected.

For more information, refer to the chapter *Organizing flows* on page 262.

State

An icon is displayed at the left of each row to indicate its flow state, as described in the following table. The flow state for a group row is equal to the "highest" flow state for any of the flows in the group (the table lists the flow states from high to low). For more information, refer to the chapter *Activating and deactivating flows* on page 273.

Icon	Description
	The flow can't be activated because it contains a design error
	The flow is being activated
	The flow is active, that is, it is being executed by Switch
	The flow is being deactivated
	The flow is inactive and it is locked for editing
	The flow is scheduled and will become active during the time specified in the Flow properties (See *Flow properties* on page 268).

Name and description

You can rename a row by clicking on the name field and entering the new name. You can also change the value of the "Name" property in the properties pane. You can add a longer (possibly multi-line) description of the flow or group in the "Description" property.

Marker

The rightmost column in the flows pane can display a marker icon selected from a predefined list of icons (including colored flags, priorities, and level of completeness indicators). You can

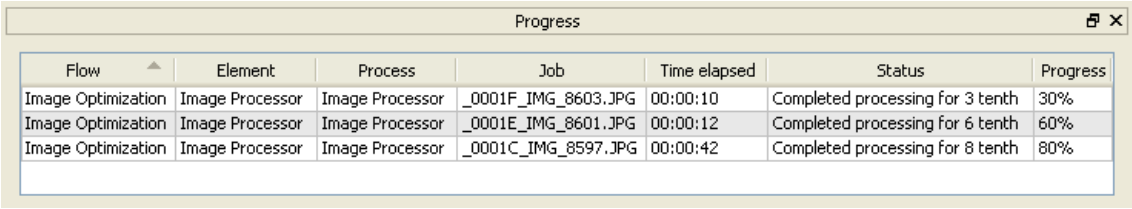
set these markers at your discretion to help organize your flows (for example, indicate work in progress). The markers have no meaning to Switch.

If you do not want to use markers, you can hide the marker column with the "Marker column" context menu item.

For more information, refer to the chapter *Setting flow markers* on page 265.

5.1.1.7. Progress pane

The Progress pane displays a list of currently executing processes with their progress information.



Progress

Flow	Element	Process	Job	Time elapsed	Status	Progress
Image Optimization	Image Processor	Image Processor	_0001F_IMG_8603.JPG	00:00:10	Completed processing for 3 tenth	30%
Image Optimization	Image Processor	Image Processor	_0001E_IMG_8601.JPG	00:00:12	Completed processing for 6 tenth	60%
Image Optimization	Image Processor	Image Processor	_0001C_IMG_8597.JPG	00:00:42	Completed processing for 8 tenth	80%

Examples of processes include internal processes such as downloading a file from an FTP site, and external processes controlled by Switch such as distilling a PostScript file. Processes are dynamically added to and removed from the list as they occur.

The columns can be added or removed as usual in Switch. Note that in Switch 18 update 2 a new column has been added, being 'Process ID'. The process ID can be for example Switch Service, Switch executable, ftp executable ,... This information can be useful for troubleshooting.

For more information, see *Viewing processes in the Progress pane* on page 288.

5.1.1.8. Properties pane

The Properties pane shows the properties of a flow or a flow element, depending on what's selected on the canvas:

- If a *single flow element* is selected on the canvas, the Properties pane shows the properties of that flow element.

  To learn how you can edit the values in the Properties pane, refer to *Changing flow element properties* on page 221.

- If *multiple flow elements* are selected, the Properties pane shows all mutual properties, i.e. the properties that can be set for every selected flow element. This allows you to change the (same) property for multiple flow elements at once.

  Note: The Name and Description of a flow element must be changed one by one.

- If *no flow elements* are selected, the Properties pane shows the *flow* properties.

  For more information, refer to *Changing flow properties* on page 267.

Properties

Property	Value
Name	Submit hierarchy
Description	Internal input folder structure
Path	Auto-managed
Leave originals in place	No
Minimum file size (KB)	None
Scan every (seconds)	Default
Time-of-day window	No
Day-of-week window	No
Day-of-month window	No
Subfolder levels	0
Process these folders	All Folders
Adjusted by (rule 1)	Excluding folders not named
Folder name	Regular expression defined
On levels	
Restriction	None
Nesting	Exclude nested subfolders as well
Adjusted by (rule 2)	None
Adjusted by (rule 3)	None
Adjusted by (rule 4)	None
Adjusted by (rule 5)	None
Attach hierarchy info	No
Attach email info	
Allow subfolder cleanup	Yes
Starting from this level	0

5.1.1.9. Statistics pane

The Statistics pane allows you to display the average time jobs reside in a particular folder or state while being moved along a flow.

You can open this pane, by clicking

in the Switch toolbar, or by selecting **View** > **Statistics** from the menu at the top of the application.

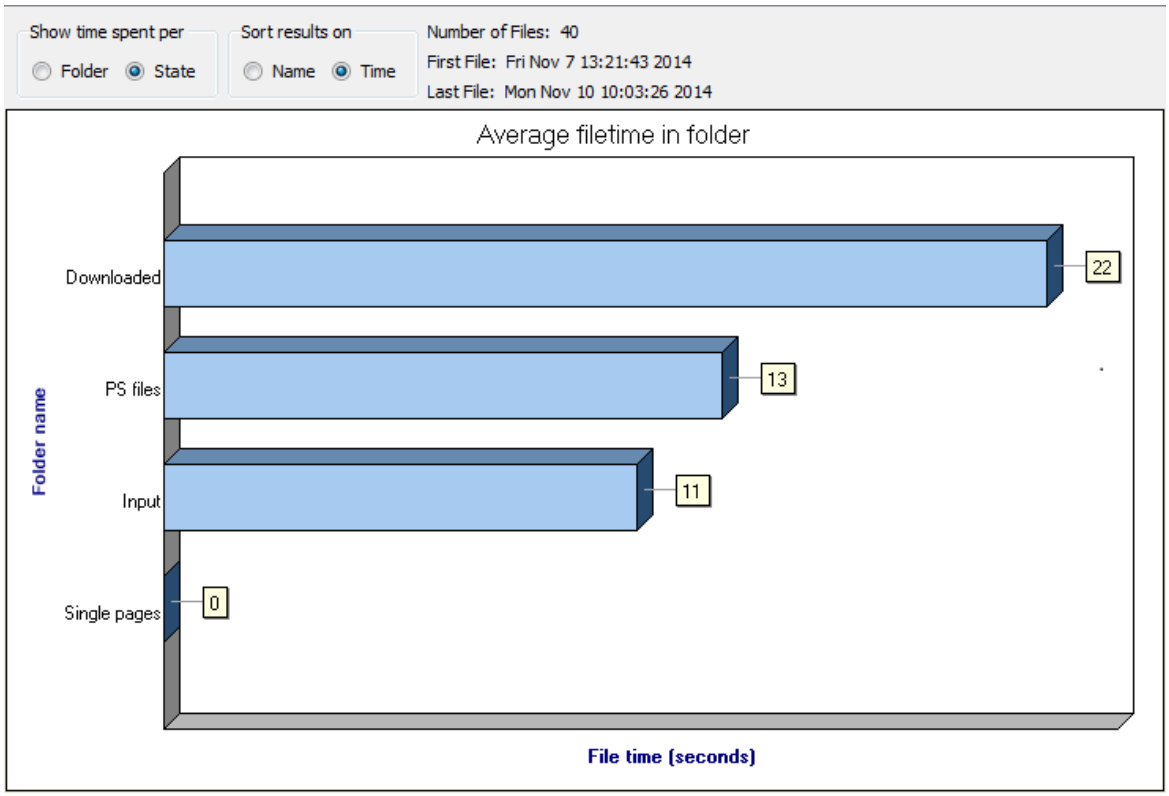
Important: Do not forget to refresh the statistics (by selecting **View** > **Refresh Statistics**), to make sure the most recent information is displayed.

The chart gives an overview of the folders or states (on the y-axis) and the average time in seconds (on the x-axis) jobs spent in each of them.

You can determine what is shown by changing the options in the **Show time spent per** and **Sort results on** sections:

- **Show time spent per Folder/State** determines what's shown in the chart below; either the average time spent in a particular (statistics-enabled) **Folder** or the time spent in a particular **State**.
- **Sort results on** determines how the information in the chart is sorted: based on the **Name** of the folder/state (alphabetically), or the **Time** (decreasing).

In the top right corner of the pane, you can see the number of files that have been processed, and the date and time the first and last file were processed.



For more information, see *Viewing statistics* on page 291.

5.1.1.10. Client Activity pane

Note: This pane is only available if you are using the legacy SwitchClient desktop application.

The **Client Activity** pane allows you to monitor the SwitchClients activities that are currently running.

The table displays more detailed information about the progress of the jobs that are running through the active flows.

Client Activity

User Name	Request Type	Start Time	Flow	Element	Job	Progress
Admin	Sending client request	Mon Nov 10 11:54:38 2014				Completed
Admin	Submitting file	Mon Nov 10 11:53:56 2014	New flow	Submit point 1	JobCustomerX....	Completed
Admin	Submitting file	Mon Nov 10 11:53:04 2014	New flow	Submit point 1	picture.jpg	Completed
Admin	Submitting file	Mon Nov 10 11:52:20 2014	New flow	Submit point 1	test2.pdf	Completed
Admin	Submitting file	Mon Nov 10 11:52:00 2014	New flow	Submit point 1	test.DOC	Completed

This pane requires the presence of a responsive Server process as it is updated every ten seconds when visible.

5.1.1.11. Client Connections pane

Note: This pane is only available if you are using the legacy SwitchClient desktop application.

The **Client Connections** pane shows which SwitchClients are currently connected.

It displays the host name, timestamp and the status of the connection. The table displays only the last connection initiated by an IP or username, for the SwitchClient. When an activity is completed, the corresponding row is removed from the table.

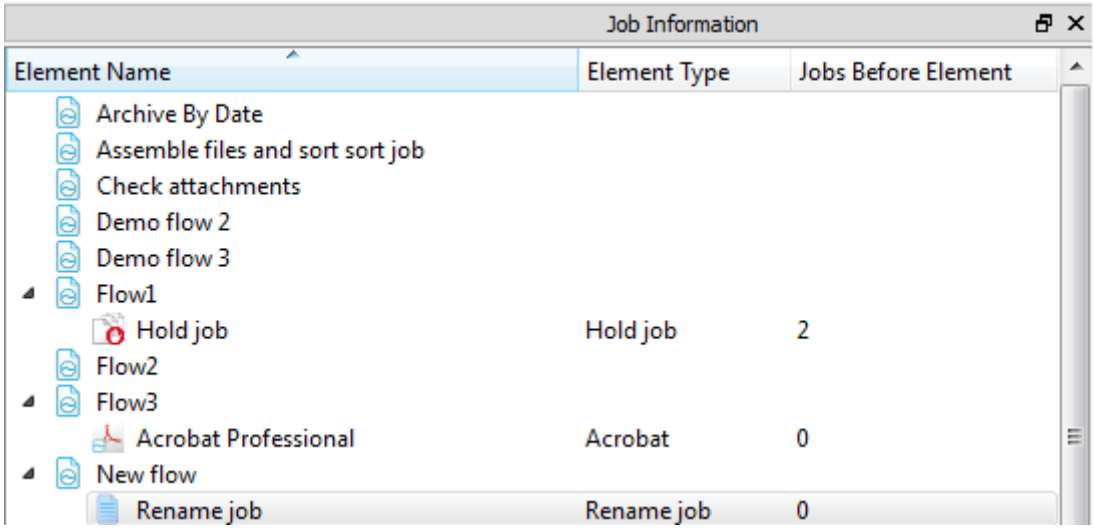
Client Connections

Host	User Name	Timestamp	Status
EAW13DL399	Administrator	Mon Nov 10 11:57:31 2014	Accepted

This pane requires the presence of a responsive Server process as it is updated every ten seconds when visible.

5.1.1.12. Job Information pane

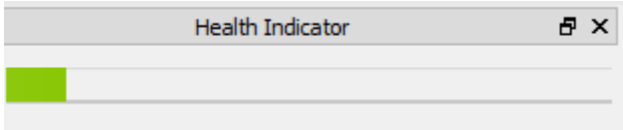
The **Job Information** pane displays current job distribution in the flows, that is, the number of jobs waiting to be processed by each flow element. Here elements are grouped by flows.



This pane requires presence of responsive Server process as it is updated constantly when visible.

5.1.1.13. Health indicator pane

The **Health indicator** monitors the internal communication processes within Switch. Under normal operation, the Health Indicator will show a green status bar.



If Switch begins to experience problems communicating with internal processes due to delayed or excessive internal communication requests, the indicator bar will change to orange or red in extreme cases. However, the Health Indicator does not change due to number of jobs or the heavy processing as this does not typically threaten the stability of Switch.

In most cases when an internal process becomes unavailable or communication is lost, the Switch Watchdog will automatically restart the failed service. If the Health Indicator frequently shows orange or red, it is recommended that you review the **Statistics** pane for details on which Switch services are experiencing problems and may require corrective action. See *Statistics pane* on page 84.

5.1.1.14. Users pane

The Users pane allows you to manage the **access rights of users accessing the Switch Server from another computer**, i.e.:

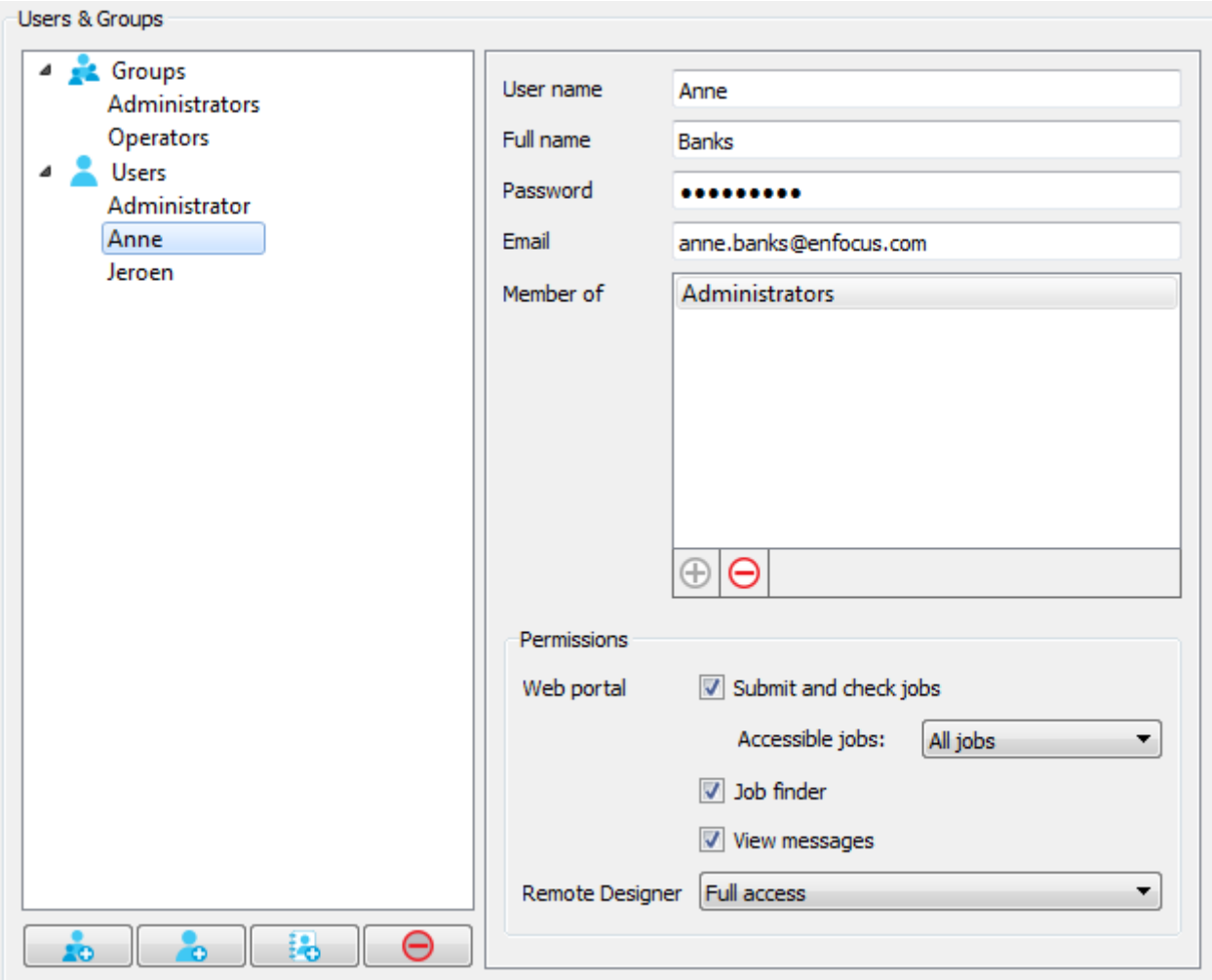
- Through the Switch Web Portal via *Submit points* and *Checkpoints* (requires a SwitchClient license) or to view log messages.

- From another computer than the one on which the Switch Server is installed, via Remote Designer.

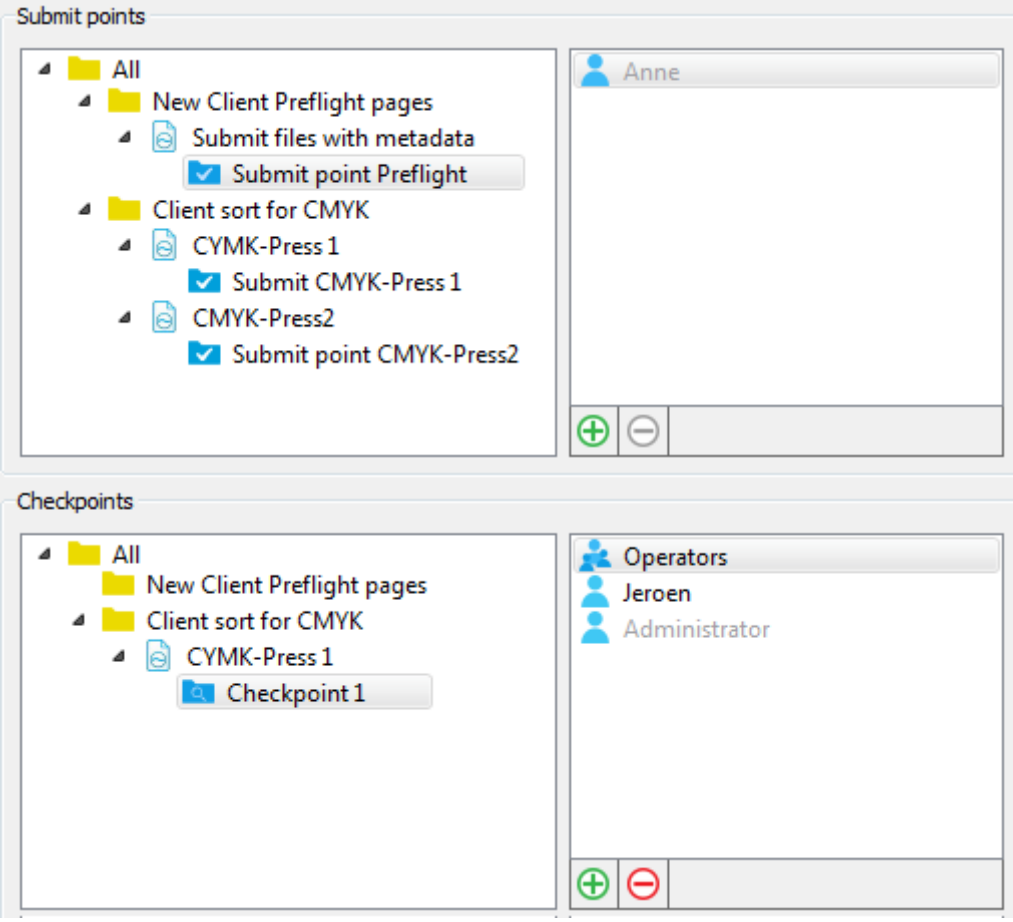
You can open this pane, by clicking the Users button in the toolbar, or by selecting **View** > **Users** from the menu at the top of the application.

The Users pane consists of two parts:

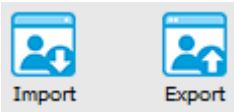
- In the left part of the pane, you can **configure users and user groups**, and assign them permissions for the Switch Web Portal and/or for Remote Designer.



- In the right part of the pane, you can grant users and user groups **access to particular Submit points and Checkpoints**. This part is only visible, if you have activated the SwitchClient and/or the Web Services module.



The buttons in the toolbar allow you to import and export user information.



For more information, see *Configuring Switch users* on page 59 and *Assigning access to Submit points and Checkpoints* on page 66.

5.1.1.15. Filtering lists

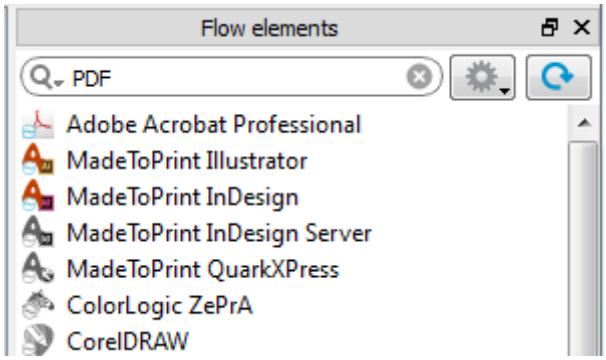
Filtering restricts the set of items shown in the list by comparing search terms (entered in the **search field**) with one or more search targets associated with the items.

Filtering is available for Flow elements and Flows.

In the **Flow elements** pane, items are not only filtered, but also searched for in the Enfocus Appstore. If the search term matches an app, you will see the app appear in the bottom part of the Flow elements pane, under "Enfocus Appstore results" and, if it is installed already on your system, you will also see it in the Apps category. See also *Working with apps in Switch* on page 299.

Using the search field

The search field is located above the list of items being managed.



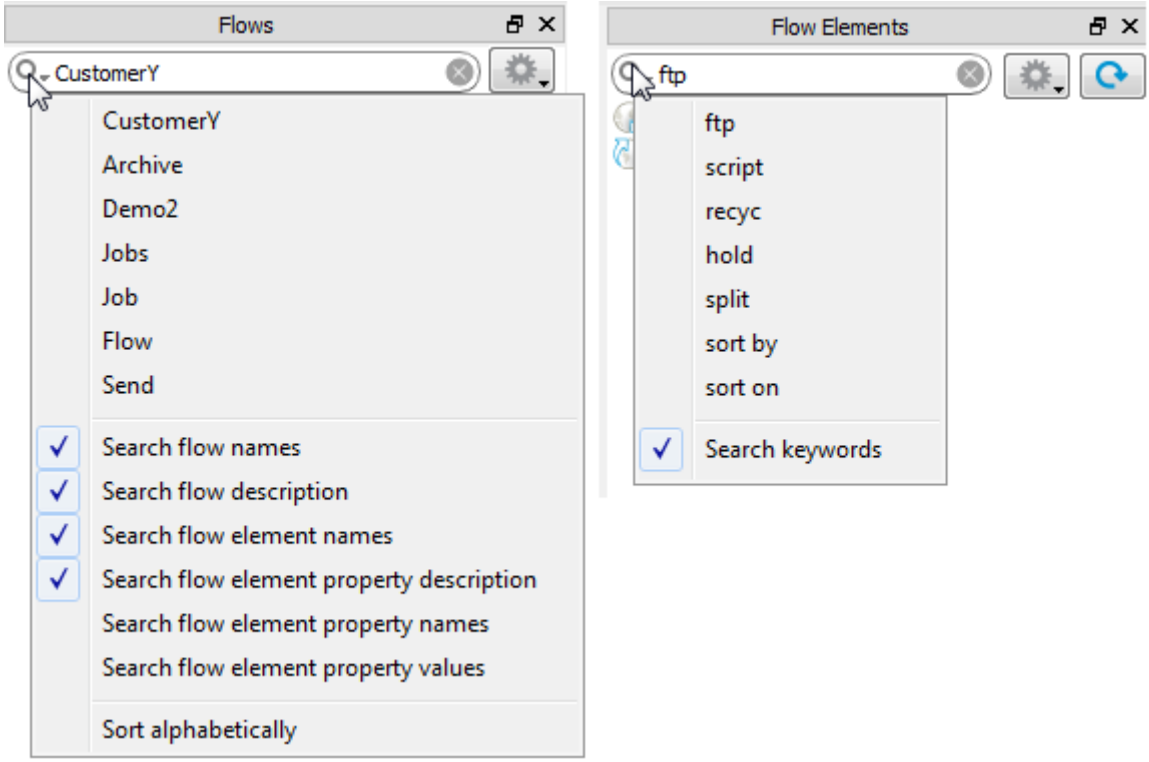
- If the search field is empty, all items are shown in the list.
- If the search field is not empty, a clear button appears at the right side of the field, to clear the search field and show all elements.

Refresh button (Flow elements pane only)

If an app you recently purchased is not in the list, you may have to click the **Refresh** button . This will install the app concerned on your local computer.

Using the search menu

You can open the search menu by clicking the **Search** button on the left side of the search field.



The search menu contains:

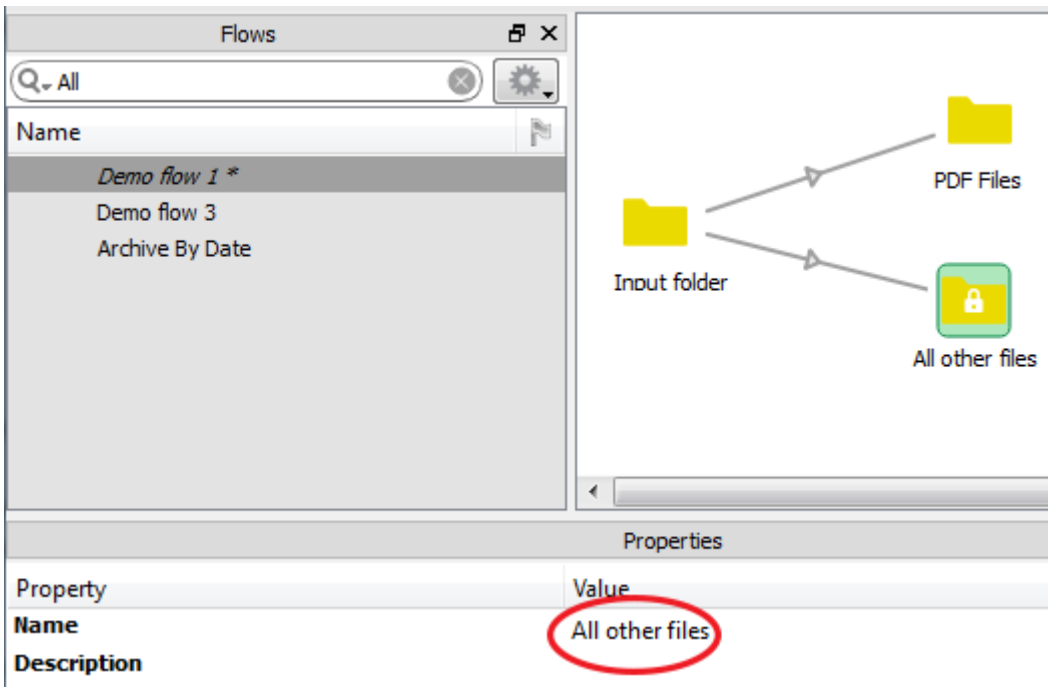
- The last 7 strings entered in the field. Selecting one will reapply this filter.
- A number of search options.

  This controls the search targets included in the search. Each menu item has a checkbox which can be turned on or off by choosing the menu item.

  For *Elements*, the name of the elements is always included in the search. You can also search for keywords, which are associated with the elements. For example searching for "PDF" will include Adobe Acrobat Distiller, although "PDF" is not a part of the Element name. For an overview of all elements and their keywords, see the *Flow elements: overview* on page 92.

  For *Flows*, you can search in the flow names, the flow descriptions, the elements used in the flows, or even the properties or values in the flow's elements. This allows for example to search for Flows containing the "Adobe Acrobat Distiller" element. If found, the flow element or connection is highlighted in green (see example below).
- Sort options, allowing to sort the search result alphabetically, or in the order they were found.

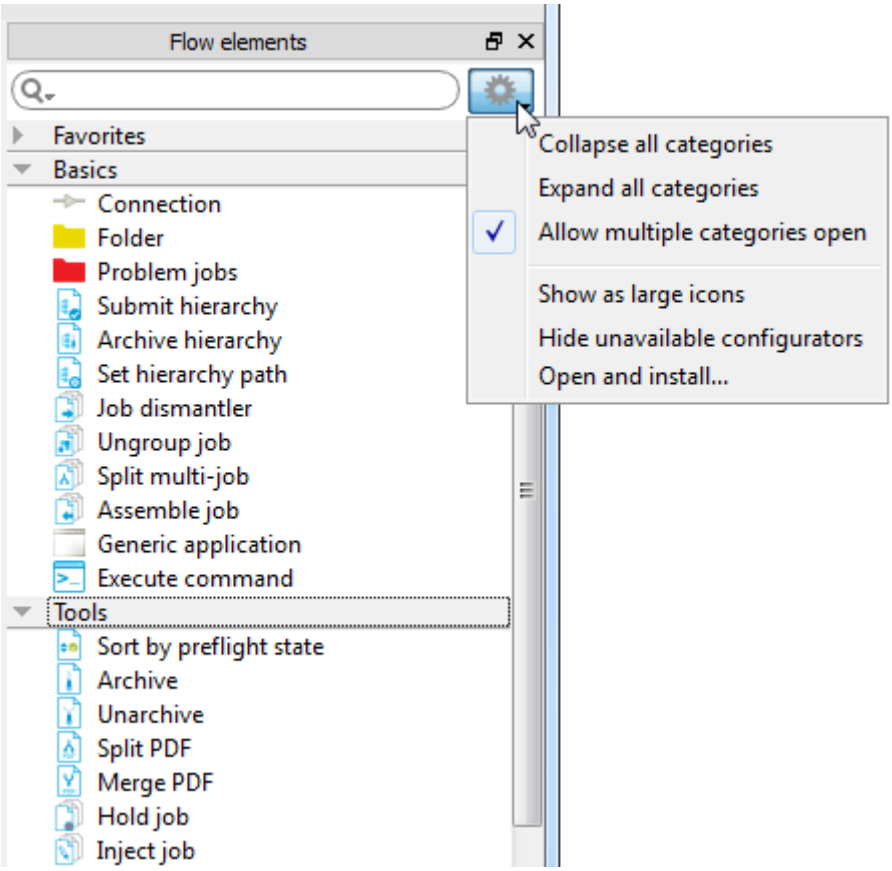
Example of a search result found in the name of a flow element



5.1.2. Flow elements: overview

This section gives a detailed overview of all flow elements available in the Flow elements pane. They are sorted by category (Basics, Tools, Scripting...) just like in the application.

Note that you can change the way the flow elements are displayed (show/hide unavailable configurators, open or collapse categories etc.), by clicking the button next to the search field.



5.1.2.1. Basics

Connection

Connection is a special flow element that serves to interconnect other flow elements. The network of connections in a flow determines how jobs can travel between the flow elements.

To connect two flow elements that are already present on the canvas, do one of the following:

- Drag the connection icon from the Elements pane and drop it onto the first flow element; then click on the second flow element.
- Double-click the first flow element to start a connection and drop it on the second flow element to connect it with the first flow element.
- Select "Start connection" in the context menu of the first flow element and drop the extension on the second flow element.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Connection** element will be shown in the list:

- move
- filter
- traffic-light

Flow element types

In terms of connectivity, there are four types of flow elements (other than connection itself):

Flow element type	Description
Folder	Represents a folder on disk that can hold jobs before, after or in between processing steps; folder has a central role in Switch (see below).
Processor	Processes jobs and thus accepts incoming and outgoing connections.
Producer	Injects jobs into a flow from an outside source (such as an email inbox); a producer does not accept incoming connections.
Consumer	Consumes jobs from a flow and possibly transports them to an outside target (such as an FTP site); a consumer does not allow outgoing connections.

The central role of the Folder element

At least one of the two flow elements being connected must be a folder. In other words, a flow element other than a folder can be connected only to a folder.

A simple rule of thumb is "there must always be a folder in between".

Connection types

There are several types of connections, each with a slightly different set of properties. The type of a connection is determined by the flow element from which the connection originates. All connections originating at a particular flow element have the same type. Some flow elements also restrict the number of outgoing connections.

Connection type	Description
Move	Simply moves jobs along (under the control of Switch); a flow element with outgoing move connections often produces only a single output along one of the outgoing connections (for example, file balancer), or it may allow just one outgoing connection
Filter	Offers properties for file filtering in addition to the move properties; a flow element with multiple outgoing filter connections (for example, folder) usually sends identical copies of its output along these connections (assuming a connection's filter allow the output to pass)
Traffic-light	Offers data and log subtypes and allows to set success-, warning- and error- filters; this connection type is used by flow elements that produce a report for human consumption and/or validate jobs against some specified

Connection type	Description
	rules (for example, preflight); multiple connections of the same subtype carry identical copies of the output
No-options	Jobs are moved under the control of a third-party application; this connection type is used only in conjunction with generic application; it offers only the most basic set of properties

Properties

The following table lists the properties for all connection types (i.e. no single connection offers all of these properties). Some flow elements "inject" extra properties in their outgoing connections. These properties are described with the flow element that injects them.

Property	Description
Name	The name of the connection displayed in the canvas; most connections have a blank name (the default) but the user can add a name if so desired; some flow elements use the name of their connections for special purposes (these rare cases are described for each flow element where applicable)
Description	A description of the connection displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the connection.
Corner angle	Determines the layout of a connection as it is drawn on the canvas Consider the rectangle formed by drawing horizontal and vertical line segments through the center of the two flow elements being connected; the breakpoint in the connection line can be positioned anywhere on the diagonal of this rectangle The corner angle is an integer number in the range [-90, 90] inclusive; the value is a measure for how much the corner formed at the breakpoint differs from a straight line; thus a zero value means a straight line (the default) and a value of ±90 means a rectangular corner (the breakpoint is positioned at one of its extremes).
Color	The color of the connection displayed in the canvas. The default is Gray, but you can select another color from the list (Yellow, Green, Cyan, Blue, or Magenta). Alternatively, you can change the color via the context menu, by selecting the **Choose color** option. Note that connections can also have "conditional" colors: • If a value is wrong in the properties, the connection can be displayed in red. • If the connection is put on hold, it's displayed as an orange dashed line. See *Putting a connection on hold* on page 280. • If a property of the connection matches a keyword entered in the search field of the Flows pane, it's displayed in green. See *Using the search menu* on page 90.

Property	Description
	Note: The "conditional" colors take priority over the "custom" colors set in this property. For example, even if you have chosen Green for your connection, its color will change to orange when the connection is set on hold. When the connection is released, the chosen color (green) will be restored.
Hold jobs	While set to yes, jobs are not allowed to move through the connection; this is mostly used to temporarily hold jobs (perhaps because there is a problem with a process downstream) The value of this property can be modified while the flow is active (through a canvas context menu item); see putting connections on hold.
Include these jobs	Jobs that match the specified filter are moved through this connection, unless they are explicitly excluded (see next property); refer to *Specifying file filters* on page 241 for more details. **Note:** If you're using a **script expression**, remember that the script expression should return a boolean value (**true or false**), instead of a string. For example, you could create a script expression to include jobs smaller than 1 MB. If the checked job < 1 MB (= matches), the result of the script is "true" and the job is included.
Exclude these jobs	Jobs that match the specified filter are never moved through this connection; refer to *Specifying file filters* on page 241 for more details. **Note:** If you're using a **script expression**, remember that the script expression should return a boolean value (**true or false**), instead of a string. For example, you could create a script expression to exclude jobs smaller than 1 MB. If the checked job < 1 MB (= matches), the result of the script is "true" and the job is excluded.
Include these folders	Subfolders that match the specified filter are included for this connection; injected by producers that retrieve jobs from an outside folder hierarchy, such as FTP receive; refer to *Specifying file filters* on page 241 for more details. **Note:** If you're using a **script expression**, remember that the script expression should return a boolean value (**true or false**), instead of a string. For example, you could create a script expression to include folders smaller than 1 MB. If the checked folder < 1 MB (= matches), the result of the script is "true" and the folder is included.
Exclude these folders	Subfolders that match the specified filter are ignored for this connection; injected by producers that retrieve jobs from an outside folder hierarchy, such as FTP receive; refer to *Specifying file filters* on page 241 for more details.

Property	Description
	Note: If you're using a **script expression**, remember that the script expression should return a boolean value (**true or false**), instead of a string. For example, you could create a script expression to exclude folders smaller than 1 MB. If the checked job < 1 MB (= matches), the result of the script is "true" and the folder is excluded.
Carry this type of jobs	Determines the type of files carried by this connection: • Data: data file (regular output) • Log: log file (reports) • Data with log: data file with the corresponding log file associated to it as an opaque metadata dataset; this is equivalent to picking up the log file with the opaque pickup tool
Dataset name	If the previous property is set to "Data with log", this property defines the name of the metadata dataset containing the log file attached to the data file; see *Picking up metadata* on page 429
Success out	If set to yes, a file will move along the connection if the originating process did not log any warnings or errors
Warning out	If set to yes, a file will move along the connection if the originating process logged at least one warning and no errors
Error out	If set to yes, a file will move along the connection if the originating process logged at least one error

Folder

Folder is a central flow element that serves as an intermediary for moving jobs between other flow elements. Each folder flow element instance represents a backing folder on disk that can hold jobs before, after or in between processing steps. The contents of the backing folder can also be accessed by external processes or by users. For example, a folder may be used to submit jobs into a flow or to retrieve the results of a flow.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Folder** element will be shown in the list:

- backing
- input
- output
- hot
- watched

Processing jobs

Any subfolders placed into a folder are treated as a job folder; that is, the subfolder and its contents are moved along as a single entity.

If a folder has no outgoing connections (that is, it is a "dead-end" folder), a job placed in the folder will stay there until it is removed by some external process that is not under the control of Switch.

If a folder has at least one outgoing connection, a job placed in the folder is removed after it was processed by all outgoing connections. If none of the filters on the outgoing connection(s) match, the job is moved to the problem jobs folder. Refer to *Handling problem jobs* on page 293 and error handling preferences for more details.

User-managed versus auto-managed folders

The backing folder (on disk) for a folder on the canvas can be auto-managed (default) or user-managed. The difference is explained in the following table:

	Auto-managed	**User-managed**
Location on disk	Special area managed by Switch, i.e. "the application data root" (see *Switch preferences: Application data* on page 45)	Location selected by the user (through the Path property)
Editable by the user?	No, users should not manipulate auto-managed folders! **Note:** The **Open in Explorer/ Finder** option in the context menu is only available if you hold down Shift while right-clicking the folder on the canvas. This is an advanced preference that only should be used for debugging purposes!	Yes, through the **Open in Explorer/Finder** option in the context menu.
Scanned?	No need to scan, as the contents is known and managed by Switch.	Yes, at regular intervals as defined in the Preferences (See *Switch preferences: Processing* on page 41)
Lock icon?	Yes	No
Remarks	External processes (not under control of Switch) and users should not refer to auto-managed folders since they can change the name and/or location under the control of Switch!	It is not allowed to point user folders to auto-managed folders (e.g. containing the result of another flow). As auto-managed folders are not scanned, this will not work.

For more information on how to create an auto-managed or user-managed folder (or to switch from one type to the other), refer to *Using Folder elements in Switch* on page 102.

Properties

Note that certain properties are present only for folders that have at least one outgoing connection, and certain other properties are present only for folders that have no outgoing connections ("dead-end" folders)

Property	Description
Name	The name of the folder displayed in the canvas. A newly created folder receives a default name ("Folder 1", "Folder 2", ...), which you should replace with a meaningful name. **Note:** If you set up a user-managed backing folder while a "Folder <number>" name is still in place, the flow element automatically adopts the name of the backing folder. For example, if you drag "D:\data\input" onto the canvas, the folder will be named "input".
Description	A description of the folder displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the folder.
Path	The path of the folder's backing folder on disk, or **auto-managed**. *The following options in italics relate to the frequency of which the folders are scanned for new files. As auto-managed folders are not scanned, these options are only available for user-managed folders.*
Leave originals in place	If set to **Yes**, incoming jobs are left untouched in the folder. Switch never writes to the folder, so read-only access rights suffice; see *Leaving originals in place* on page 229. If set to **No** (default), incoming jobs are moved out of the folder; Switch needs full access rights to rename, create and remove files and folders. *Ignore updates (only available if if **Leave originals in place** is set to **Yes**)* If set to **Yes**, a job will only be processed once, regardless of any changes to the file size or modification date. This can be used for workflows where the input job is replaced by the processing result, to avoid triggering endless loops. If set to **No**, the job will be reprocessed when its file size or modification date is different. This allows processing jobs which have the same file name as previously submitted jobs.
Minimum file size (KB)	Used to set the minimum file size limit (in KB) before Switch picks up the files or folders. To set no limits, leave it empty.
Scan every (seconds)	The frequency with which this folder is scanned for newly arrived jobs. If set to **Default** or zero, the global user preference is used instead; see *Switch preferences: Processing* on page 41.
Time-of-day window	If set to **Yes**, the folder detects (and moves) newly arrived jobs only during a certain time of the day (specified in the subordinate properties). *Allow from (hh:mm)* and *Allow to (hh:mm)*

Property	Description
	The time-of-day window during which to detect jobs. The values are structured as "hh:mm" (hours, minutes) indicating a time of day on a 24 hour clock; an empty value means midnight; two identical values mean the folder always detects jobs.
Day-of-week window	If set to **Yes**, the folder detects (and moves) newly arrived jobs only during certain days of the week (specified in the subordinate properties). *Allow from* and *Allow to* The days of the week (Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday) during which to detect jobs. Two identical values mean the folder only detects jobs on that specific day.
Day-of-month window	If set to **Yes**, the folder detects (and moves) newly arrived jobs only during a certain day of the month (specified in the subordinate properties). *Day* The day in the month during which to detect jobs, as a number in the range [1 . .31]; the default value of one means the first or the last day of the month (depending on the following property). *Relative to* Determines whether the day of the month is relative to "Start of the month" or "End of the month".
Color	The color of the folder displayed in the canvas. The default is Yellow, but you can select another color from the list (Orange, Green, Cyan, Blue, Magenta). Alternatively, you can change the color via the context menu, by selecting the **Choose color** option. Refer to *Adjusting the colors of folders and connections* on page 225.
Attach hierarchy info	If set to **Yes**, the folder's name is added to each job's hierarchy location path as the job passes through the folder; see *Using hierarchy info* on page 232. *Add name at the top* If set to **Yes**, the folder name is added at the top of the hierarchy location path; otherwise it is added at the bottom.
Attach email addresses	The specified email addresses are added to each job's email info as the job passes through the folder; see *Using email info in Switch* on page 233.
Attach email body text	The specified email body text is added to each job's email info as the job passes through the folder; see *Using email info in Switch* on page 233.
Attach job state	If the specified string is non-empty, the job state of each job is set to the string as soon as the job arrives in the folder; the statistics view can display the average time spent for each job state. For more information, see *Viewing statistics* on page 291.

Property	Description
Flow stage	The stage assigned to the job folder. This allows you to check where jobs are in a flow. The flow stage of a job can be viewed on the job boards on the Switch Portal.
Set job priority	• If set to **None** (default), nothing happens. • If set to any other value (including zero), the job priority of each job is set to this new value as soon as the job arrives in the folder. **Note:** The specified value is converted to a number and rounded to the nearest integer; text strings that do not represent a number are converted to zero. To specify a negative value, use the **Single-line text with variables** property editor or provide a script expression.
Safe move	This option is only available for output folders and relevant for transferring job files between folders on different volumes (drives/partitions). If set to **Yes** (default value), Switch will first copy the job to a temporary file before deleting the job from the original location. This is useful to avoid that files get lost in case of network problems. If set to **No**, Switch immediately moves the job files to the output folder. This may be necessary in case of network permission issues.
Strip unique name	If set to **Yes**, the unique name prefix added to the filename by Switch is removed before placing the job in the folder. the default is to strip the prefixes from jobs deposited in a dead-end folder - leaving the prefixes in place avoids overwriting a previously deposited job with the same name. *Duplicates* *Determines what happens when **Strip unique name** is set to **Yes** and a job arrives with the same name as a job already residing in the folder:* • ***Overwrite**: replace the existing job with the new one – this is the default behavior.* • ***Keep unique name**: preserve the new job's unique name prefix, leaving the existing job untouched (without unique name prefix).* • ***Add version number**: add an incrementing version number at the end of the filename body for the new job ("2", "3", ... "9", "10", "11"), leaving the existing job untouched. For example, "job.pdf" will become "job1.pdf"," job2.pdf", ...* *Optionally, you can add a **separator** between the filename body and the version number, for example an underscore. In that case, e.g. "job.pdf" will become "job_1.pdf"," job_2.pdf", ... By default, the **Separator** property is empty.* *You can also determine the **width** of the version number, i.e. the number of digits used for the version number. For example, if Width is set to*

Property	Description
	"5", the version number will consist out of 5 digits (e.g. job_00001.pdf), meaning that leading zeros will be added as required. • **Fail**: move the new job to the problem jobs folder, leaving the existing job untouched.
Ignore these subfolders	All subfolders that match the specified folder filter are ignored for the purpose of counting the number of jobs residing in this folder. This property appears only when the folder's outgoing connection leads to a generic application; if that application stores information in subfolders inside its input folder, this property allows Switch to ignore these folders and their contents.

Set job private data (property not present in dead end folders)	Allows you to attach private data to the jobs arriving in the folder.
	Format: *key=value* (one key per line)
	Example:
	`Reference=[Job.NameProper]`
	`Customer=[Email.From]`
	Note: The first instance of the equals sign ('=') separates the key from its value. As a consequence,'=' is not allowed in the key, but it can be used in the value of the key if required.

Show in statistics	Set to **Yes**, if the average time that jobs reside in this folder should be calculated and displayed in the Statistics pane. For more information, see *Viewing statistics* on page 291.

Using Folder elements in Switch

To create a Folder element in Switch

1. Do one of the following:
   - To create an **auto-managed** folder, drag the Folder icon from the Elements pane onto the canvas.

     If you check the Path in the Folder properties, you will see that the value "auto-managed" is filled in automatically.
   - To create a **user-managed** folder, drag a folder from your system onto the canvas.

     If you check the Path in the Folder properties, you will see that the path to the folder is filled in automatically.

   Note: Submit hierarchy folders are always user-managed, as the hierarchy of the folders must be determined by the user.

2. To convert a folder from auto-managed to user-managed as required, do one of the following:
   1. Choose a folder path for the Folder's Path property

2. Drag a folder from the Folders pane onto the folder in the canvas.
3. Drag a folder from any location onto the Folder element on the canvas.

3. To convert a folder from user-managed to auto-managed, choose **auto-managed** for the Folder's Path property.

Working with flow stages

What are flow stages?

"Flow stage" is an optional *folder* property that indicates a logical stage in a flow.

For example, if in the first part of the flow files are preflighted, in the second part they are prepared for large format print and in the last part they are moved to the appropriate folder on the server, you may split up your flow in three stages: Preflight, Prepare for print, and Distribute (regardless of the number of folders in your flow).

For which folders a flow stage should or can be defined?

A job gets associated with a flow stage as soon as it arrives in the folder. This means that folders that mark the beginning of a stage should have a flow stage defined.

If a job arrives in a folder that does not have a flow stage, the flow stage linked to the job simply does not change.

If a job is moved to the Problem jobs folder, it gets the default "Problem jobs" stage assigned. This stage is kept until the job is retried and is injected in the flow again; from that moment onwards the job gets the previous job stage assigned (= the stage it should have if not moved to the Problem jobs folder).

Note that it is not possible to define a flow stage for a folder at the end of a flow (so a folder without outgoing connection).

Note: Stages do not have to be unique, not on flow-level, not on Switch-level.

Where can you see the flow stage of a job?

The flow stage associated with a job is shown on the Switch Web Portal, on the job boards (in the properties of the job).

What are flow stages typically used for ?

The flow stage of a job provides information about the status of the job; it indicates in what logical stage of the flow a job currently is. It can be interesting for an operator to know which jobs are in a particular stage, for example which jobs are problem jobs (= have the 'problem jobs' status), which jobs are finished, etc.

For a quick overview of the jobs and the flow stage they are in, you can create virtual job boards on the Switch Web Portal. Such a job board could for example only display jobs with a particular flow stage.

For more information, refer to *Finding Switch jobs through the Switch Web Portal* on page 316

Problem jobs

Problem jobs is a special flow element that represents the Switch problem jobs folder. When a Switch process fails to handle a particular job, the "problem job" is moved to the problem jobs folder.

Refer to *Handling problem jobs* on page 293 for more information.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Problem jobs** element are:

- error
- failure

Connection

The problem jobs tool can be placed in a flow on its own, without any connections. In that case it serves simply as an easy way to access the problem jobs from the designer user interface (for example, when you select the problem jobs tool, the Files pane shows its contents). See *Handling problem jobs* on page 293 for more information.

If the problem jobs tool has an outgoing connection, it acts as a producer picking up any problem jobs that arrive and injecting them into the flow (again). This allows providing automated error handling. You can add a filter to the outgoing connection to select the jobs you want to handle, leaving the others in the problem jobs folder. In any case be careful to avoid endless loops of jobs that fail over and over again.

The problem jobs tool supports only one outgoing connection. To overcome this limitation, connect it to a regular folder from which you can originate as many connections as you like.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the problem jobs folder displayed in the canvas, for example indicating if the flow contains all problem jobs of all flows or only the current flow's problem jobs (see next property). The description is also shown in the tooltip that appears when moving your cursor over the connection.
Handle problem jobs for	Determines the "scope" of this problem jobs tool: • This flow only: acts on problem jobs generated just by the flow containing this flow element • All flows: acts on all problem jobs generated in this copy of Switch

Property	Description
Send alerts to	*This property is only available if* ***Handle problem jobs for*** *is set to* ***This flow only****.* Determines who will receive alert messages if a job arrives in a Problem jobs folder. **Note:** Alerts are only sent if enabled in the *Problem alerts preference*, i.e. if the *Problem job arrives* preference is set to Yes! Otherwise, no alerts are sent! Options are: • *Default:* In this case, alerts are sent to the email addresses entered in the *Send problem alerts to* preference. • *One or more email addresses*, separated by a colon (if entered via *Inline Value*) or a newline (if entered via the *multi-line text* editor): alerts will be sent to all entered email addresses.

Multiple problem jobs tools

A flow can have at most one problem jobs element; including more than one will keep the flow from activating.

In addition, at any one time, the active flows in Switch can have at most one problem jobs element with a scope set to "All flows".

Submit hierarchy

Submit hierarchy is a producer that supports one or more levels of subfolders. Since it is a producer, a Submit hierarchy can be used only to submit jobs into a flow. The backing folder (on disk) for a Submit hierarchy should typically be user-managed.

Each subfolder up to the nesting level specified by the "Subfolder levels" property is treated as if it were an individual hot folder.

A *file* placed inside a subfolder at the specified nesting level, or at any level closer to the main folder, moves along the flow as a file.

A *job folder* placed inside a subfolder at the specified nesting level moves along the flow with its contents as a single entity (that is, as a job folder).

A job folder placed on the same level as the allowed subfolders is treated as a subfolder by mistake, and its contents are moved along as separate files.

Keywords

Keywords can be used with the search function available in the Flow elements pane.

The keywords for the **Submit hierarchy** element are:

- backing
- folder
- subfolder
- structure
- input
- hot
- watched

Connections

Submit hierarchy does not allow incoming connections.

Submit hierarchy injects folder filter properties into its outgoing connections so that it is possible to include/exclude certain subfolders in the hierarchy for particular connections.

Note: The number of eligible jobs for processing is shown in a small rectangle beside the Submit hierarchy element.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.

Path	The path of the Submit hierarchy's backing folder on disk. This is the highest level where Switch must start searching for files or folders to be processed.
	Note:
	• From Switch 13 onwards, it is no longer possible to define "auto-managed" Submit hierarchy elements.
	• If you have different Submit Hierarchy flow elements in one flow, they are allowed to point to (partly) the same paths as required. As this is special behavior (not allowed for other flow elements!):
	  • You will get a warning in the error log, but it won't stop the flows from being activated.
	  • In the Jobs pane, the content of all Submit hierarchies using the same path will be shown when clicking on each individual element. The same goes for the counters on the canvas.

Leave originals in place	If set to **Yes**, incoming jobs are left untouched in the folder hierarchy; read-only access rights suffice. For more information, see *Leaving originals in place* on page 229.

Property	Description
	If set to **No** (default value), incoming jobs are moved out of the folder hierarchy; Switch needs full access rights to rename, create and remove files and folders in the hierarchy.
Ignore updates	*This option is only available if Leave Originals in place is set to Yes.* If set to **Yes**, a job will only be processed once, regardless of any changes to the file size or modification date. This can be used for workflows where the input job is replaced by the processing result, to avoid triggering endless loops. If set to **No**, the job will be reprocessed when its file size or modification date is different. This allows processing jobs which have the same file name as previously submitted jobs.
Minimum file size (KB)	Used to set the minimum file size (in KB) limit before Switch picks up the files or folders. To set no limits, leave it empty (value **None**).
Scan every (seconds)	The frequency with which this submit hierarchy is scanned for newly arrived jobs; if set to **Default** or zero, the global user preference is used instead; see *Switch preferences: Processing* on page 41.
Time-of-day window	If set to **Yes**, Submit hierarchy detects (and moves) newly arrived jobs only during a certain time of the day (specified in the subordinate properties).
Allow from (hh:mm)	*Only available if Time-of-day window is set to Yes.* The time-of-day window during which to detect jobs; the values are structured as "hh:mm" (hours, minutes) indicating a time of day on a 24 hour clock; an empty value means midnight; two identical values mean Submit hierarchy always detects jobs.
Allow to (hh:mm)	
Day-of-week window	If set to **Yes**, Submit hierarchy detects (and moves) newly arrived jobs only during certain days of the week (specified in the subordinate properties).
Allow from	*Only available if Day-of-week window is set to Yes.* The days of the week (Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday) during which to detect jobs; two identical values mean Submit hierarchy only detects jobs on that specific day.
Allow to	
Day-of-month window	If set to **Yes**, Submit hierarchy detects (and moves) newly arrived jobs only during a certain day of the month (specified in the subordinate properties).

Property	Description
Day	*Only available if Day-of-month window is set to Yes.* The day in the month during which to detect jobs, as a number in the range [1 . .31]; the default value (1) means the first or the last day of the month (depending on the following property).
Relative to	Determines whether the day of the month is relative to "Start of the month" or "End of the month".
Subfolder levels	The number of nested subfolder levels considered to be hot folders (as opposed to job folders); indicates how many levels deep Switch must search for new files or jobs. Note that, if the specified level contains another subfolder, this subfolder will be considered as one job, i.e. it will be processed as one entity, and not as a separate job. **Tip:** If you are not sure about the number of levels, or if you want all files to be processed separately (regardless of their nesting level in the hierarchy), set the Subfolder levels property to a very high value (for example: 999).
Process these folders	Defines the initial set of folders that should be processed by the Submit hierarchy tool. This set can be adjusted by defining one or more rules in the subsequent properties. Options available in this menu are: • **All Folders** (default) • **No Folders**
Adjusted by (rule 1)	This property defines a rule for adjusting the set of folders to be processed, by including or excluding folders matching or not matching a folder name. Different rules can be applied, and will be processed in the order as they are specified. Options available in this menu are: • **None** (default) • **Including folders named** • **Including folders not named** • **Excluding folders named** • **Excluding folders not named**
Folder name	*The following properties are only available if Adjusted by (rule1) is enabled.* A pattern for the folder name to be included or excluded.

Property	Description
	For example: all folders containing a particular prefix (e.g. "input_") or a particular value (e.g. the current date). **Note:** If you're using a **script expression**, remember that the script expression should return a boolean value (**true or false**), instead of a string matching the folder name. For example, you could create a script expression to filter out all folders smaller than 1 MB. If the checked folder < 1 MB (= matches), the result of the script is "true" and the folder is filtered out.
On levels	The level or range of levels to which this rule applies.
Restriction	Defines an optional restriction on the parent or ancestors for the folder in this rule. Options available are: • **None** (default) • **With immediate parent named** • **With no immediate parent named** • **With any ancestor named** • **With no ancestor named**
Parent name or Ancestor name	*Only available if a restriction is set on a parent or ancestor for the folder.* A pattern for the folder name of the parent or ancestor.
Nesting	Defines whether this rule operates on subfolders of the target folder, which are deeper in the hierarchy than the defined level range. The matching rule is also applied on these subfolders. • **Exclude/Include nested subfolders as well** • **Don't exclude/include nested subfolders**
Adjusted by (rule 2) . . . Adjusted by (rule 5)	You can configure up to 5 rules for adjusting the set of folders to be processed. The properties are identical to Adjusted by (rule 1).
Attach hierarchy info	If set to **Yes**, (part of) a job's submit location, depending on the hierarchy info configuration, is added to its hierarchy location path as it is submitted in the flow. By default, once the files have been processed, they are all placed in the same output folder, at the highest level. However, if you set Attach hierarchy info to Yes, the original location of the job in the hierarchy is stored with

Property	Description
	the file (in a so called "internal job ticket"), so that it can be used to recreate the hierarchy. Thanks to this mechanism, you can "on the fly" (so while the job is passing different flow elements) construct the path in which the processed job will be placed. For more details, refer to *Using hierarchy info* on page 232.
Include hierarchy name	*Only available if Attach hierarchy info is enabled.* If set to **Yes**, the name of the flow element is included at the top of the remembered location path.
Include subfolder levels	Identifies the number of hierarchy segments in the hierarchy information.
Save top subfolders	If set to **Yes**, the *top-most* subfolders are remembered in the location path. If set to **No**, the *bottom-most* subfolders are remembered.
Attach email info	Email addresses and body text specified with the editor for this property are added to each job's email info as the job is submitted in the flow; the information added can vary depending on the subfolder in which the job was submitted. See *Using email info in Switch* on page 233.
Allow subfolder cleanup	If set to **Yes**, subfolders created in the Submit hierarchy (by an external process or a user) are automatically removed when they become empty.
Starting from this level	*Only available if Allow subfolder cleanup is set to Yes.* The number of upper levels for which not to clean up subfolders

Archive hierarchy

Archive hierarchy is a consumer that creates a nested hierarchy with one or more levels of subfolders. It is used to archive jobs into a structured hierarchy at the end of a flow. The resulting jobs are to be consumed (and removed) by an external process. The backing folder (on disk) for an archive hierarchy should typically be user-managed.

It is not allowed for an external process or a user to place files into an archive hierarchy.

An archive hierarchy uses the hierarchy location path stored in a job's internal job ticket to determine where the job should be stored, up to the nesting level specified for the archive hierarchy. Any superfluous segments in a location path are ignored. Subfolders are created automatically.

See *Using hierarchy info* on page 232 for more details.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Archive hierarchy** element will be shown in the list:

- backing
- folder
- subfolder
- structure
- output

Connections

The **Archive hierarchy** allows outgoing traffic light connections. With the help of these traffic light connections, you can fail files that were not archived properly and you can also send a notification to the administrator or IT department about this problem.

With the **Archive hierarchy** tool, you can first archive your files and later send email notification to internal operators, CRMs, etc. You can also store your files in the internal Archive before uploading them to an FTP Server to make them accessible to external users.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Path	The path of the archive hierarchy's backing folder on disk, or "auto-managed".
Subfolder levels	The number of nested subfolder levels in the archived structure; see also the description on subfolders earlier.
Safe move	This option is only relevant for transferring job files between folders on different volumes (drives/partitions). If set to **Yes** (default value), Switch will first copy the job to a temporary file before deleting the job from the original location. This is useful to avoid that files get lost in case of network problems. If set to **No**, Switch immediately moves the job files to the Archive hierarchy. This may be necessary in case of network permission issues.
Strip unique name	If set to **Yes**, the unique name prefix added to the filename by Switch is removed before placing the job in the archive hierarchy; the default is to strip the prefixes from jobs deposited in an

Property	Description
	archive hierarchy - leaving the prefixes in place avoids overwriting a previously deposited job with the same name
Duplicates	*Determines what happens when **Strip unique name** is set to **Yes** and a job arrives with the same name and location as a job already residing in the hierarchy:* • ***Overwrite**: replace the existing job with the new one – this is the default behavior.* • ***Keep unique name**: preserve the new job's unique name prefix, leaving the existing job untouched (without unique name prefix).* • ***Add version number**: add an incrementing version number at the end of the filename body for the new job ("2", "3", ... "9", "10", "11"), leaving the existing job untouched. For example, "job.pdf" will become "job1.pdf"," job2.pdf", ...* *Optionally, you can add a **separator** between the filename body and the version number, for example an underscore. In that case, e.g. "job.pdf" will become "job_1.pdf"," job_2.pdf", ... By default, the **Separator** property is empty.* *You can also determine the **width** of the version number, i.e. the number of digits used for the version number. For example, if Width is set to "5", the version number will consist out of 5 digits (e.g. job_00001.pdf), meaning that leading zeros will be added as required.* • **Fail**: move the new job to the problem jobs folder, leaving the existing job untouched.

Set hierarchy path

Set hierarchy path is a processor that replaces or augments the hierarchy path in the internal job ticket by constructing a fresh path from the segments specified as its properties. There are five segment properties and thus a maximum of five path segments can be specified (an empty value means "unused").

Since the segment properties support variables (and script expressions), this tool is a great help when building custom archive hierarchies, for example organizing jobs in a folder hierarchy based on today's year, month, and day.

Keywords

Keywords can be used with the search function above the elements pane.

The keywords for the **Set hierarchy path** element are:

- folder

- subfolder
- structure

Connections

Set hierarchy path allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your mouse over the flow element
Action	Determines how to combine the new segments with the existing hierarchy location path: • Replace: replace any existing hierarchy location path by the path formed by the new segments • Add at the top: add the new segments at the top of the existing hierarchy location path • Add at the bottom: add the new segments at the bottom of the existing hierarchy location path • Remove: remove one or more segments from the existing hierarchy location path • Reverse: put the top segments at the bottom and vice-versa
Path segment 1 ... Path segment 5	The new path segments; an empty value means "unused"; a maximum of five path segments can be specified
Start index	The one-based index of the first segment to remove (topmost segment is index 1)
End index	The one-based end index of the last segment to remove; zero means until the end of the path

Job dismantler

Job dismantler is a processor that disassembles a job folder (which may have one or more levels of subfolders) into separate files.

This tool is often used to dismantle job folders that really do not represent a single job. This happens for example when a user submits a folder into the flow that contains a set of otherwise unrelated files that need to be processed individually rather than as a single entity.

Each incoming file or job folder is treated with the semantics of a submit hierarchy with regards nested subfolders and job folders.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Job dismantler** element are:

- hierarchy
- folder
- subfolder
- ungroup
- group
- assemble
- disassemble

Connections

Job dismantler injects folder filter properties into its outgoing connections so that it is possible to include/exclude certain subfolders in the incoming job folders for particular connections. Also see the "skip folders" property described below.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Subfolder levels	The number of nested subfolder levels considered to be hot folders (as opposed to job folders); see also the description in *Submit hierarchy* on page 105
Attach hierarchy info	If set to yes, (part of) a job's location in the job folder is added to its hierarchy location path as it is injected in the flow; see using hierarchy info for more details
Add dismantler name	If set to yes, the name of this flow element is included in the remembered location path
Add job folder name	If set to yes, the name of the incoming job folder is included in the remembered location path
Include subfolder levels	Identifies the number of hierarchy segments in the hierarchy information.

Property	Description
Save top subfolders	If set to yes, the top-most subfolders are remembered in the location path, otherwise the bottom-most subfolders are remembered
Keep existing info	If set to yes, the new information is added at the bottom of the existing location path; otherwise the existing location path is replaced
Attach email info	Email addresses and body text specified with the editor for this property are added to each job's email info as the job is injected in the flow; the information added can vary depending on the subfolder in which the job was located; see *Using email info in Switch* on page 233 for more details

Ungroup job

Ungroup job is a processor that, in combination with assemble job, provides a way to keep track of files that belong together while they are being processed separately.

Ungroup job injects all files from a job folder into the flow as separate jobs. After these files have been processed through the flow (and possibly were renamed), assemble job can reassemble them into a new job folder with a structure similar to the original one, with provisions for injecting additional files and for dealing with incomplete jobs or orphaned files.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Ungroup job** element are:

- hierarchy
- folder
- subfolder
- ungroup
- group
- assemble
- disassemble

Usage examples

- Split a multi-page PDF file in separate pages; process each page separately through one or more applications that can deal only with a single page at a time; recombine the pages in a job folder; merge the pages into a single PDF file.

- Receive a job folder that contains a nested structure of related files; disassemble the folder into separate files; sort the files on file type and put them through some different process depending on the file type; re-assemble the files into a job folder with a structure that is identical to the incoming job folder.

Connections

Ungroup job allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Private data key	The first portion of the private data key used to store the information for reassembling the job later on Varying this value here and in assemble job allows: • Ensuring that a job is reassembled by the intended assembler • Nesting ungroup/reassemble operations

Private data

Ungroup job stores the following information in the internal job ticket for each injected job file, for use by assemble job:

Private data key	Stored value
<key>.JobID	The unique name prefix of the incoming parent job
<key>.JobName	The name of the incoming parent job (without prefix)
<key>.NumFiles	The total number of files injected in the flow for this parent job
<key>.FileName	The name of this file as injected in the flow
<key>.FilePath	The relative path of this file within the parent job folder

Split multi-job

Related Adobe InDesign or QuarkXPress jobs are often stored in a single job folder with multiple "main" files at the top level and shared resources (such as images and fonts) in subfolders. The Switch configurators for these applications however expect a single main file in each job folder, so these "multi-job folders" cannot be processed without change.

The Split multi-job tool splits a multi-job folder in separate job folders, one for each main file. Each resulting job folder contains a single main file, and a full copy of all resources (in fact, everything from the original job folder except for the other main files).

Keywords

Keywords can be used with the search function above the Flow elements pane.

The keywords for the **Split multi-job** element are:

- Adobe InDesign
- QuarkXPress
- multiple
- job
- package
- folder
- assemble
- disassemble

Connections

Split multi-job allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Main file type	The file type or file name extension of the main files. The tool will output a separate job folder for each main file in the incoming job folder. Main files are recognized only if they are located immediately inside the job folder, not in a subfolder

Assemble job

Assemble job is a processor that offers various schemes for assembling a job folder from individual job files.

Note: When designing a flow, do NOT use folders with *network paths* prior to the Assemble job element.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Assemble job** element are:

- hierarchy
- folder
- subfolder

- ungroup
- group
- assemble
- disassemble
- build

Connections

Assemble job supports outgoing traffic-light connections of the following types:

- Success out: carries successfully assembled jobs.
- Error out(optional): carries incoming jobs that cannot be assembled into a job after a certain timeout period.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Scheme	Determines the scheme used to assemble jobs: • Arbitrary files: combines arbitrary files based on number and/or time • Numbers in filename: uses digit groups in the incoming filenames to combine files • Filename patterns: uses filename patterns to combine up to 5 related files in a job • Ungrouped job: uses the information stored by an instance of ungroup job to reassemble a job • Custom: allows specifying a custom formula for determining matching files
Every N jobs	Displayed when Scheme is Arbitrary files. A job is completed whenever it contains at least the indicated number of files; a value of 0 means this option is disabled
Every N minutes	Displayed when Scheme is Arbitrary files. A job is completed whenever more than the indicated time has expired since the previous assembly was completed; a value of 0 means this option is disabled
After N minutes	Displayed when Scheme is Arbitrary files or Custom. A job is completed whenever more than the indicated time has expired since the first job in this assembly arrived; a value of 0 means this option is disabled

Property	Description
Number index for total	Displayed when Scheme is Numbers in filename. The one-based index of the digit group determining the total number of files; automatic means the digit group that represents the largest number
Number index for serial	Displayed when Scheme is Numbers in filename. The one-based index of the digit group determining the serial number for each file; automatic means the digit group that represents the smallest number
Match filename	Displayed when Scheme is Numbers in filename. The filename without the indexed numbers of the files to asemble in job must be the same.
Filename pattern 1 ... Filename pattern 5	Displayed when Scheme is Filename patterns. Up to five filename patterns (using the regular wildcards ? and *) that serve to detect matching files; empty patterns are ignored For filenames to match, they must conform to the specified patterns and the text portions matched by the wildcards must be identical When the Assemble job tool takes an incoming job, it matches the job file name with the file patterns. When the job file name matches with a filename pattern, the matched pattern is no longer used. Therefore, the order in which you enter the filename patterns is important. For example: You have two filename patterns and one is an extension of the other, viz., *.png and *_test.png. It is recommended to enter *_test.png in the **Filename pattern 1** field and enter *.png in **Filename pattern 2** field.
Private data key	Displayed when Scheme is Ungrouped job. The first portion of the private data key used to store the ungroup information; specify the same value as in ungroup job
Number of files	Displayed when Scheme is Ungrouped job or Custom. The total number of files expected to complete the output job: • Automatic: the same number of files as was present in the original folder before it was ungrouped • Inline value: enter an explicit value in the field • Define single-line text with variables: a constant integer or a short JavaScript expression in function of the variable "N" (example: "N+2" or "2*N"); this function has NO access to the scripting API • Define script expression: a script expression (with full access to the scripting API) that has an integer result; the

Property	Description
	expression is re-evaluated for each newly arrived job in the context of that job
Job identifier	A string value using variables (or a script expression), evaluated in the context of each arriving job, that identifies the output job in which the arriving job belongs The string is used only for the purpose of determining which jobs belong together; it has no other meaning
Complete condition	A job (using Custom scheme) is completed if this condition is true, even if the required number of jobs hasn't arrived. The condition is re-evaluated for each newly arrived job in the context of that job. A value of None means this option is disabled.
Merge metadata	If set to no, the metadata for the assembled job is copied from a single (arbitrary) incoming job, and metadata from all other jobs is lost. If set to yes, the metadata for the assembled job is derived from all incoming jobs: • All email addresses are used, and email bodies are merged. • User name and Job state will be arbitrarily selected from all jobs, or will be empty if this is empty for all jobs • The highest priority among all incoming jobs will be used. • Private data and External datasets will all be retained. If multiple jobs have private data or external datasets with the same tag, a dataset or value will be arbitrarily chosen. All other metadata will be arbitrarily selected from one of the incoming jobs
Job folder name	The filename of the created job folder, or Automatic to construct a default name depending on the scheme (e.g. the reassemble scheme uses the job name stored by the ungroup tool) Question marks in the filename pattern are replaced by a running count; e.g. Job??? will produce Job001, Job002, ... Variables (and script expressions) are executed in the context of one of the incoming jobs, chosen arbitrarily
Subfolder levels	The number of nested subfolder levels in the job folder being assembled The tool uses the hierarchy location path or the ungrouped job private data to determine where the job should be stored, up to the specified nesting level (similar to archive hierarchy)

Property	Description
Strip unique name	If set to yes, the unique name prefix is removed before placing the job in the job folder being assembled
Duplicates	Determines what happens when "strip unique name" is set to yes and a job arrives with the same name and location as a job already residing in the job folder being assembled: • Overwrite: replace the existing job with the new one – this is the default behavior • Keep unique name: preserve the new job's unique name prefix, leaving the existing job untouched (without unique name prefix) • Add version number: add an incrementing version number at the end of the filename body for the new job ("2", "3", ... "9", "10", "11"), leaving the existing job untouched • Discard: remove the new job, leaving the existing job untouched • Fail: move the new job to the problem jobs folder, leaving the existing job untouched
Orphan timeout (minutes)	The time delay after which incoming jobs are considered orphaned because they are not part of a completed job. Incoming jobs remain in their respective input folder until the last job arrives that completes an output job folder; whenever a new job arrives, the timeout counter is reset for already arrived jobs that are part of the same output job folder. Orphaned jobs are moved along the outgoing data error connection, or if there is no such connection, they are moved to the problem jobs folder. If this property is set to 0, incoming jobs that are not part of a completed job remain in the input folder. Switch does not treat them as orphaned jobs; they are not moved along the outgoing data error connection (if there is one) and they are not moved to the problem jobs folder.

Generic application

Generic application is a processor that functions as a stand-in for a third-party hot-folder application.

Note: The Generic Application element is only available if you have an active license for the Configurator Module.

The third-party application must be configured independently, and its input and output folders must refer to the backing folders of the corresponding flow elements preceding and following the generic application in the flow design.

Files are moved along the incoming and outgoing connections of a generic application under the control of the third-party application (not under the control of Switch). Still, designing the generic application flow element and its connections into the flow at the appropriate place has several key advantages:

- Switch ensures that the third-party application's output files receive the appropriate unique name prefix so that internal job ticket information (such as hierarchy info and email info) is preserved.
- Switch automatically cleans up files left in the input folder by the third-party application.
- If the third-party application runs on the same computer, Switch can launch the application when needed.
- Switch is able to gather its regular processing statistics for the third-party application.
- The third-party application's function is documented in context of the complete flow.

Because the incoming connection is under the control of the third-party tool, the incoming folder, the connection and the generic application tool itself behave different than regular Switch flow elements:

- the input folder has no properties to attach hierarchy info, e-mail addresses, e-mail body text or job state, set job priority or show in statistics.
- the input folder does have a special property to ignore sub folders.
- the input folder can only have one outgoing connection
- the connection cannot be set on hold.
- the generic application tool can only have one incoming connection.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Generic application** element are:

- hot
- watched
- folder
- third-party

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Known application	Set to yes if you can browse to the third-party application's executable on the same computer system; this allows Switch to launch and monitor the application
Path	The absolute file path of the third-party application's executable

Property	Description
Launch application	If set to yes, Switch launches the third-party application when it is needed and if it is not already running
Abort application	If set to yes, Switch aborts the third-party application if it exceeds the time limit specified by the user preference "Abort processes after" (see error-handling preferences)
Perform cleanup	If set to yes, Switch removes files left in the input folder left by the third-party application; it is strongly recommended to leave this option turned on unless you are sure that the third-party application removes its input files in all circumstances, including error conditions
When detecting output files (N)	Remove a file from the input folder after at least the specified number of output files have been detected for the file; a value of zero means this option is disabled; Switch uses the unique name prefix to match output files with input files, so if the third-party application's output files are not named similar to its input files, this option will not work
After (min)	Remove a file from the input folder if more than the specified time has passed; provide sufficient extra time for unforeseen circumstances; a value of zero means this option is disabled

Execute command

Execute command is a tool that executes a system command or a console application with the specified command-line arguments and output mechanisms.

Note: The Execute command element is only available if you have an active license for the Configurator Module.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Execute command** element are:

- command
- console
- third-party
- CLI

Connections

Execute command allows only a single outgoing connection

Properties

Properties	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Execution Mode	This property helps you to configure the tool to handle jobs in parallel (concurrent) or serial mode: • **Concurrent**: Choose this option to enable the tool to process jobs simultaneously through multiple instances of the **Execute Command** tool while using the same application. **Note:** • The application you choose should support concurrent processing. • Use the **Concurrent processing tasks** property in the **User Preferences** > **Processing** tab to set the number of concurrent processes. • **Serialized**: Choose this option to enable the tool to process jobs using only a single instance of the **Execute Command** tool.
Command or path	The system command to be executed (only allowed for commands from the operating system!), or the **absolute path** to the console application to be invoked. **Note:** If you don't know the location of the application, search for it in the documentation of the application or search for the application on your disk. On Windows, applications are usually installed under C:\Program Files \ or C:\Program Files (x86)\. On Mac, you can use Spotlight to search in the system files (see *http://support.apple.com/kb/HT4355*) .
Arguments	The remainder of the command line; the following substitutions are made in the specified text: • %1: the absolute path of the input file/job folder • %2: the absolute path of the output file/job folder (which does not yet exist) including filename and extension • %3: the absolute path of a folder (which does exist) in which output or temp files may be placed All of these substitutions work even if "Output" is set to None or Original (in which case any generated output is discarded)

Properties	Description
	Placeholders (%1, %2, %3) and argument values that may contain spaces (such as file paths) must be enclosed in quotes!
Output	Determines how the command generates its output (the tool automatically moves the output to the outgoing connection): • None: the command generates no output (or any generated output is discarded) and nothing is moved to the outgoing connection • Original: the command generates no output (or any generated output is discarded) and the incoming job is moved to the outgoing connection • Updated input job: the command updates or overwrites the incoming job in place • Result next to input job: the command places the output next to the input job (i.e. in the same folder) • File at path: the command places a single output file at the absolute path specified by %2 • Folder at path: the command places a single output job folder at the absolute path specified by %2 • Result in folder: the command places the output inside the existing folder at absolute path %3 **Note:** When you enter %3 in the Arguments property, the tool creates a temporary folder named ExecuteCommandTemp. Switch sends the entire ExecuteCommandTemp folder (and not just the contents of the folder) as job folder to the outgoing connection.
Copy input job	If set to yes, the incoming job is copied to a temporary location before the command is triggered; this must be turned on in cases where the command modifies the input job or places files in the folder where the input job resides This property is not present for some choices of output because in those cases the incoming job must always be copied
Output job filter	Determines which of the generated files or folders is the output file; Automatic works unambiguously if a single file is generated; otherwise a simple heuristic is used to make an "educated guess"
Output extension	The filename extension of the output job to be provided to the command line (i.e. the substitution of %2); Automatic means use the same extension as the input job

Properties	Description
Fail if exit code is	Fails the job (that is, moves it to the problem jobs folder) if the command's exit code is: • Nonzero • Negative • In range • Outside range • Disregard exit code
Range	A range specified as "n1..n2;n3..n4" where the n's represent a positive or negative integer or are missing to indicate an open end; for example: "-7..-4; 0.."
Fail if stdout contains	Fails the job (that is, moves it to the problem jobs folder) if the regular console output contains the search string or pattern; empty means disregard the regular console output
Fail if stderr contains	Fails the job (that is, moves it to the problem jobs folder) if the console error output contains the search string or pattern; empty means disregard the console error output

Best practice

We recommend creating a working command in Command Prompt on Windows or Terminal on Mac first, before actually configuring the Execute command flow element.

Keep in mind that **Switch will execute the command directly in the operating system** while Command Prompt and Terminal use a shell. This results in some differences in behavior, the most important one being that you always have to provide the full path to the command line application in Switch, even when this is not necessary in Command Prompt or Terminal!

For complex issues, it may be handy to **enable the logging of debug messages** (see *Switch preferences: Logging* on page 47). The table below gives an overview of the debug messages that will be logged when running the Execute Command Tool:

Debug message	Meaning
Executing	Complete command which Switch will execute after it replaced the placeholders with the actual paths.
Outcode	The outcode/exitcode of the command. Switch decides whether or not the command was successful.
Stdout	Output of the command in case executing the command went well. This is the same output as you would see when executing the command in Command Prompt or Terminal.
Stderr	Output of the command in case of problems. This is the same output as you would see when executing the command in Command Prompt or Terminal.

If none of the above debug messages are generated, the operating system failed to execute the command itself. Check if the path to the application is correct and check if you have the right permissions.

Redirecting

Redirecting output from a command to a text file is a feature of the shells used in Terminal and Command Prompt and is therefore not possible using the Execute command tool in Switch.

As a workaround, you can create a batch file that uses a shell that supports redirecting. Use this batch file as a command and send input and output paths as arguments to this batch file.

Example:

Setup of the Execute Command Element:

- Command or path: /path/to/bash/script.sh
- Arguments: "%1" "%2"
- Output: File at path

Contents of the script.sh batch file:

```
#!/bin/bash
sed "s/\&/\&amp;/g" "${1}" >> "${2}" (This example will replace “&” with “&amp;” in
 text files)
```

Best practices

- Sometimes it is useful and easier to **write arguments in the Script Expression dialog**. Below is an example:

  ```
  Command or path: cp
  Arguments: Script expression defined:
        "var destPath = "/Users/user/Desktop/dest";
        var path = job.getPath();
        var command = "\"" + path + "\" \"" + destPath + "\"";
        command;"
  ```

- Make sure that all the passed arguments are the **real arguments of the specified process**. In the example below, the TASKKILL command is not the command of Application.

  ```
  Command or path: C:/Program Files/Application /Application 1.0/Application/
  Application.exe
  Arguments:     /t "%1" "option with space" "option with space"  TASKKILL /IM
   "Application.exe" <-- WRONG -->
  ```

  A similar mistake would be to write the following in cmd:

  ```
  C:\Users\user>dir "c:\folder1\folder2" taskkill /im Application.exe <-- WRONG -->
  ```

  On the contrary, this is the right way to write it:

  ```
  C:\Users\user>dir "c:\folder1\folder2"        <-- CORRECT -->
  C:\Users\user>taskkill /im Application.exe    <-- CORRECT -->
  ```

- Make sure to use **variables** (%1, %2, %3) correctly. Below is an example:

  ```
  Command or path: tar
  Arguments: -zxvf "%1" -C "%3"
  ```

- Remember to use **quotes** when referring to paths.

```
dir c:/folder/inner folder  <-- WRONG -->
dir "c:/folder/inner folder" <-- CORRECT -->
```

- Preferably, use a **bat file/shell script** instead of an executable or an app.

  This means that the "Command or path" property is used to select the bat file or shell script and the variable parameters. All other arguments are put in the bat file or shell script. This approach has two advantages:

  - It keeps the Arguments property cleaner and easier to read.
  - The executable or app in the Execute command is running in a different environment than when used in a command prompt/terminal window. This may be necessary to be able to work with certain environment variables.

  Example:

```
Content of the shell script:
#!/bin/bash
export PATH="$PATH:/cygdrive/c/Program Files/MySQL/MySQSL Server 5.7/bin"
echo $PATH
#do everything that you want
#start your application for example
mysql $1

Command or path: <path to bash>
Arguments: <path to sh> <mysql arguments>
```

- You can use **Switch variables in the 'Arguments' property**, because all the variables are evaluated and actual values are passed inside the script; actually, the arguments from the 'Arguments' property become script arguments, accessible inside the script via $1, $2 etc. or %1, %2 etc. However, keep in mind that it is useless to write Switch variables inside .sh or .bat scripts, as Switch doesn't work with the script content.
- Use the **Run tool to recheck the command and arguments on Windows**. For example, proceed as follows:

  1. Find Run on your system.
  2. Put "cmd /K dir <path to the directory>" (without quotes) in Run.
  3. Press Enter.
  4. Recheck that the output is correct.

5.1.2.2. Tools

Sort by preflight state

Sort by preflight state is a processor that sorts incoming Enfocus Certified PDF files across its outgoing connections depending on their preflight state: Error, Success, Warning or Sign-off.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Sort by preflight state** element are:

- Enfocus
- Status check
- PDF
- preflight
- error
- success
- warning
- sign-off

Properties

Property	Description
Name	The name of the configurator. Default is "Sort by preflight state".
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.

Rejecting jobs

This tool rejects the following incoming jobs (that is, these jobs are moved to the Problem jobs folder):

- Jobs other than a single PDF file
- PDF files that are not Certified PDF

Archive

Archive is a processor that places the incoming file or a job folder into a compressed ZIP archive (ZIP64-compliant). All files in a job folder are placed in a single archive. The archive is named as the incoming file or job folder with a ".zip" extension.

Note:

- The Archive tool replaces the (now outdated) Compress tool, which did not provide Unicode support. Only use Compress (now available in the Legacy category) for maintenance reasons.
- Very large files (+4 GB) can be archived as well.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Archive** element are:

- ZIP
- archive

Connections

Archive allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Compress	If set to **Yes**, the files in the ZIP archive are compressed (default behavior). If set to **No**, the files are stored in the ZIP archive without compression, dramatically reducing the processing time; this can be meaningful when speed is more important than size, or when the files will not compress well anyway (for example, in case of JPEG images) – but you still want a single archive containing all files.
Password	The password used for protecting archives, or **None** (if not password-protected).

Note: Switch uses zlib which does not support the AES encryption, therefore Switch cannot read passwords which use the AES encryption. Hence, the Unarchive tool cannot read passwords which have been encrypted using the AES encryption. As a workaround, users can try using a third-party archiver as a command line application from Switch.

Unarchive

Unarchive is a processor that extracts files from an archive in ZIP or RAR format (ZIP64-compliant).

Any files that are not recognized as an archive are passed through the Problem jobs folder.

Note:

- The Unarchive tool replaces the (now outdated) Uncompress tool, which did not provide Unicode support. Only use the old Uncompress (now available in the Legacy category) if you need support for MIME.
- Very large archives (+4 GB) can be unarchived as well.

Keywords

Keywords can be used with the search function above the Flow elements pane.

The keywords for the **Unarchive** are:

- ZIP
- RAR
- archive
- compress
- decompress
- unzip
- unrar

Filenames and folder structure

The following table describes the resulting file or folder structure and the corresponding naming conventions.

Multiple files from the same archive are always placed in a job folder. If the intention is to inject these files into the flow as separate jobs, a job dismantler should be placed directly after the Unarchive flow element.

Archive contents	Unarchive result
Single file	The file (named as specified in the archive).
Multiple files or folders with a common root folder	A job folder (named as the nearest common root folder) containing all files and folders (named as specified in the archive).
Multiple files or folders without a common root folder	A job folder (named as the archive after stripping the extension) containing all files and folders (named as specified in the archive).

Connections

Unarchive allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Passwords	A list of passwords for opening password-protected archives; each of the passwords in the list will be tried in turn. The script expression can be used to determine a password dynamically, for example based on the sender of the packed data. **Note:** The result of the script expression evaluation must be a string containing one password or a list of passwords separated by a newline character ('\n').

Property	Description

	Example:
	`var thePasswords = new Array();`
	`thePasswords.push( "password" );`
	`thePasswords.push( "password2" );`
	`thePasswords.join( '\n' );`

Remove redundant folders	If set to **Yes**, for archives where the files or job folders are contained in deeply nested subfolder structures, removes all but the deepest subfolder level while uncompressing. **Example:** A PDF file that is archived as "Folder 1\Folder 2\Folder 3\Test.pdf" is uncompressed as "\Folder3\Test.pdf", if this option is enabled.

Note: The Unarchive tool cannot read passwords which have been encrypted using the AES encryption. Switch uses zlib which does not support the AES encryption. As a workaround, users can try using a third-party archiver as a command line application from Switch.

Split PDF

Split PDF is a processor that produces a job folder containing a separate PDF file for each page or range of pages in the incoming PDF file. The tool does not require Adobe Acrobat or any other external application to be installed.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Split PDF** element are:

- PDF
- split
- merge
- pages

Connections

Split PDF allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.

Property	Description
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Pages per file	The number of pages in each output file. You can enter a number, or use variables and script expressions. **Examples:** • To create output files of 20 pages each, select **Inline value** and type "20". • To create 5 output files, each of the same number of pages (depending on the total number of pages of the input file), select **Define single-line text with variables** and compose the following variable: [Switch.Calculation:Expression="[Stats.NumberOfPages]/5"].
Filename prefix	The string pattern to be inserted before the filename.
Filename suffix	The string pattern to be inserted after the filename (but before the file name extension.
Keep page labels	Select **Yes** to retain the page labels from the original file; select **No** if the resulting files should not contain any page labels.

File naming

For each incoming PDF file, the tool creates a job folder that contains the PDF files resulting from splitting the incoming PDF file into sections of one or more pages. The files are named by adding a prefix and/or suffix to the incoming file's name.

In the values of the filename prefix and suffix properties described above, the following character sequences (regardless of case) are replaced by the appropriate number for the file as follows:

sequence	Replaced by
[Index]	The one-based index (in the original file) of the first page stored in this result file.
[LastIndex]	The one-based index (in the original file) of the last page stored in this result file.
[Label]	The PDF page label of the first page stored in this result file. If the page does not have a label, its one-based index is used.
[LastLabel]	The PDF page label of the last page stored in this result file. If the page does not have a label, its one-based index is used.
[LastSourceLabel]	The PDF page label of the last page in the original file. If the page does not have a label, its one-based index is used.

sequence	Replaced by
[Total]	The total number of pages in the original file.

Note:

- For [Index] and [LastIndex], leading zeros are added so that the index has the same number of digits as the total number of pages in the original file.
- If the constructed filename contains characters that are not allowed in filenames on Windows (control characters, \, /, :, *, ?, <, > and |), these characters are replaced by a #, even if Enfocus Switch is running on Mac.

Example

This example is based on a PDF file named "Booklet.pdf". It contains 15 pages. The first 4 pages are labled in roman numbers, followed by 2 chapters with respectively 6 and 5 pages, labeled "1-2", "1-3", etc.

Property settings	Resulting files
Default settings: • Pages per file = 1 • Prefix = "" • Suffix = "_[Index]"	• Booklet_01.pdf • Booklet_02.pdf • ... • Booklet_15.pdf
• Pages per file = 2 • Prefix = "" • Suffix = " pages [index]-[LastIndex] of [Total]"	• Booklet pages 01-02 of 15.pdf • Booklet pages 03-04 of 15.pdf • ... • Booklet pages 15-15 of 15.pdf
• Pages per file = 1 • Prefix = "[Index]" • Suffix = "[Label]	• 01 Booklet i.pdf • 02 Booklet ii.pdf • 03 Booklet iii.pdf • 04 Booklet iv.pdf • 05 Booklet 1-1.pdf • ... • 10 Booklet 1-6.pdf • 11 Booklet 2.1.pdf

Property settings	Resulting files
	• ... • 15 Booklet 2-5.pdf

Merge PDF

Merge PDF is a processor that produces a single PDF file containing all of the pages provided by the PDF files in the incoming **job folder**. The tool does not require Adobe Acrobat or any other external application to be installed.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Merge PDF** element are:

- PDF
- split
- merge
- pages

Connections

Merge PDF Pages allows only a single outgoing connection

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Keep page labels	Select the "Yes" option in the drop-down menu to retain the page labels from the original file. If you select the "No" option, the resulting files will not contain any page labels

PDF metadata

File, Title, Author, Subject and Keywords will be merged if all input PDF files have the same value. So in case a flow uses a Split PDF and Merge PDF tool, this metadata can be restored. If the metadata has different values, the merged PDF will have empty metadata fields.

Switch metadata

The Merge PDF tool processes a job folder, so Switch metadata is derived from that folder and not from the individual PDF files.

PDF version

The merged PDF will have the highest PDF version number. Example: Merge two files, one PDF version 1.4 and the other PDF version 1.6, the result will be PDF version 1.6.

Merge order

The tool will merge the files in increasing alphabetical order of file name.

However, if

- every file name contains at least one number and
- every file has the same amount of numbers (consecutive digit groups) in their file name,

the Merge order processor will take the lowest number represented by any of the digit groups in the file name as "Rank". If no two files have the same rank, the processor will merge the files in order of increasing rank.

Note:

More advanced merge ordering can be achieved by using the Sort files in job tool in front of the Merge PDF pages tool. See *Sort files in job* on page 150.

Examples

The Merge PDF will correctly collate all of the examples provided for the Split PDF in Pages tool (see *Split PDF* on page 132)

Incoming files	Ordering
• Booklet_**01**.pdf • Booklet_**02**.pdf • ... • Booklet_**15**.pdf	All file names have a single digit group representing a ranking number that is unique among the complete set of files: this ranking is used to order the files
• Booklet pages **01**-**02** of **15**.pdf • Booklet pages **03**-**04** of **15**.pdf • ... • Booklet pages **15**-**15** of **15**.pdf	All file names have the same number of digit groups (3). The lowest number offers a correct ranking that is unique among the complete set of files: this ranking is used to order the files
• **01** Booklet i.pdf • **02** Booklet ii.pdf • **03** Booklet iii.pdf • **04** Booklet iv.pdf	The file names have different amounts of digit groups (1 vs 3), so the files will be ordered alphabetically. Even if the file names would have the same number of digit groups, the ranking would be alphabetically, as their would be doubles in ranking (each chapter number occurs more than once.

Incoming files	Ordering
• **05** Booklet **1**-**1**.pdf • ... • **10** Booklet **1**-**6**.pdf • **11** Booklet **2**-**1**.pdf • ... • **15** Booklet **2**-**5**.pdf	However, because the page index (including the leading zeroes) appears early in the file name, the alphabetical order will put the pages in the same order as before splitting

Hold job

Hold job is a processor that offers various time-based schemes for holding and releasing jobs and for distributing jobs across multiple outgoing connections.

Note: When designing a flow, do NOT use folders with *network paths* prior to the Hold job element.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Hold job** element are:

- delay
- file
- balancer
- priority
- queue
- distribute

Connections

Hold job allows any number of outgoing move connections and offers additional properties on each of those connections.

Properties

Properties	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element

Properties	Description
Job priority	The priority assigned to each incoming job; jobs with higher priority are released first; a greater number indicates a higher priority Default means: use the job priority defined in the job ticket The value of this property is converted to a floating point number; the Boolean value True and string values that commonly represent True convert to 1, the Boolean value False and any string values that don't represent a number or True convert to 0
Delay scheme	Select "Delay", "Release condition" or "None" in this drop-down menu to define the type of delay scheme you want to define. **Delay**: When you select "Delay", jobs are delayed for a certain period of time (specified in the subordinate properties), and a job becomes eligible for release only after it has resided in the input folder for at least the specified period of time (as set in the subordinate properties). **Release condition**: When you select "Release condition", jobs become eligible for release only after the release condition has been evaluated to true (that is, it has satisfied the conditions which have been set in the subordinate properties).
Retry after (if you've chosen Delay scheme: Release condition) or *Unit* (if you've chosen Delay scheme: Delay condition)	Select the unit for the time delay: Seconds, Minutes, Hours, Days
Retry unit (if you've chosen Delay scheme: Release condition) or *Delay* (if you've chosen Delay scheme: Delay condition)	Provide the job delay in the units indicated by the previous property. You can enter an explicit value in the field or specify using the Define single-line text with variables or Define script expression dialogs available from the pop-up menu
Release condition	Specify the condition which should be evaluated to true before the job is released. You can specify the value using the "Define condition with variables" or "Define script expression" dialogs available from the pop-up menu (making it possible for you to use values from Switch variables, metadata, a database or script expressions). The release condition is executed repeatedly using N units. For example: if we set the delay as 5 minutes, the release condition will be checked every 5 minutes

Properties	Description
Output order	Determines the order in which outgoing connections receive jobs (relevant only if there is more than one): • Cyclic: always in the same cyclic order • Random: in pseudo-random order

Outgoing connection properties

The following properties are provided for each of the outgoing connections in addition to the basic connection properties.

Property	Description
Connection priority	The priority of this connection; a greater number indicates a higher priority; at any given time only the eligible connections with the highest priority will receive jobs
Folder constraint	If set to yes, this connection is eligible to receive jobs only when certain constraints on the target folder (specified in the subordinate properties) are met
Maximum job count	This connection receives a job as long as its target folder contains no more than this number of jobs after adding the job; a zero value means this constraint is disabled
Maximum file count	This connection receives a job as long as its target folder contains no more than this number of files after adding the job; a zero value means this constraint is disabled
Maximum folder size (MB)	This connection receives a job as long as its target folder's size does not exceedthis limit after adding the job; a zero value means this constraint is disabled
Target folder	The absolute path of the folder that should be checked for job count and/or size; Default means the connection's target folder **Note:** Whenever a job arrives in the **Hold job** tool, Switch checks the Target folder. Jobs that are in between the **Hold job** tool and the Target folder are not taken into account for the constraint. To make sure that there are no jobs in between the **Hold job** tool and the Target folder, space the jobs apart for a certain period of time.
Time-of-day window	If set to yes, this connection is eligible to receive jobs only during a certain time of the day (specified in the corresponding properties)
Allow from (hh:mm)	The time-of-day window during which to receive jobs; the values are structured as "hh:mm" (hours, minutes) indicating a time
Allow to (hh:mm)	

Property	Description
	of day on a 24 hour clock; an empty value means midnight; two identical values mean the connection is always eligible
Day-of-week window	If set to yes, this connection is eligible to receive jobs only during certain days of the week (specified in the subordinate properties)
Allow from	The days of the week (Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday) during which to receive jobs; two identical values mean the connection is eligible for that 1 single day
Allow to	
Day-of-month window	If set to yes, this connection is eligible to receive jobs only during a certain day of the month (specified in the subordinate properties)
Day	The day in the month during which to receive jobs, as a number in the range [1 .. 31]; the default value of one means the first or the last day of the month (depending on the following property)
Relative to	Determines whether the day of the month is relative to "Start of month'" or "End of the month"
Space jobs apart	If set to yes, jobs moving over this connection are spaced apart by a minimum period of time (specified in the subordinate properties); example: after the connection receives a job it becomes eligible to receive another job only after the specified period of time has passed
Unit	Select the unit for the subsequent property: Seconds, Minutes, Hours, Days
Delay	The spacing delay in the units indicated by the previous property

Scheduling algorithm

The scheduling algorithm is executed whenever a new job arrives, at regular intervals:

1. Determine J, the set of eligible jobs, to include all incoming jobs that have fully arrived and that have waited for at least the delay specified for the job (if any).
2. If J is empty, there are no jobs to be moved – terminate.
3. Sort the jobs in J on priority (higher priority first) and within the same priority on arrival stamp (earliest arrival first).
4. For each job in J, in the sorted order, perform these steps:
   a. Consider A to be the set of outgoing connections.
   b. Determine B as the subset of A containing connections that can accept the job at this time (that is, the connection is not on hold and none of its constraints are violated).
   c. If B is empty, the job can not be moved at this time – skip to next job.
   d. Determine C as the subset of B containing all connections with the highest priority that occurs within B. By definition all connections in C have the same priority and C is non-empty.
   e. Select one of the connections in C according to the selected algorithm (cyclic or random).

f. Move the job along this connection.

Inject job

Inject job is a a processor (acting as a producer) that injects a job into the flow when triggered by an incoming job or by various time-based events. The injected job can be selected dynamically from a repository of jobs, it can be a fixed job, or it can be the incoming job itself.

The properties for each outgoing connection specify what needs to happen for that connection (independently of other connections). For example, to inject a job from a repository based on the metadata of some incoming job while keeping the original job around, setup one connection to receive the incoming job, and a second connection to receive the job from the repository.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Inject job** element are:

- trigger
- timer

Connections

Inject job supports an optional incoming connection and allows any number of outgoing connections. It offers additional properties on each of its outgoing connections.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.

Outgoing connection properties

The following properties are provided for each of the outgoing connections in addition to the basic connection properties

Property	Description
Trigger	Specifies the type of event that triggers injection for this connection: • **Incoming job**: an injection is triggered for each incoming job. • **Time since previous job**: an injection is triggered when the specified period of time passed since the last job arrived.

Property	Description
	• **Time of day**: an injection is triggered at the specified time(s) during the day.
	*The following subordinate properties are present if **Trigger** is set to **Time since previous job**.*
Unit	Selects the unit for the subsequent property: Minutes, Hours, Days.
Delay	The trigger delay in the units indicated by the previous property.
Repeat	If set to *Yes*, a new injection is triggered repeatedly at the specified interval as long as no jobs arrive; if set to no, an injection is triggered only once (until a new arrival resets the timer).
	*The following subordinate properties are present if **Trigger** is set to **Time of day**.*
Time (hh:mm)	The time of day when the first injection is triggered. The specified time value is used only for the first injection after a flow was activated. The subsequent injections are controlled by the *Repeat unit* and *Repeat delay* properties.
Repeat unit	Selects the unit for the subsequent property: Minutes, Hours.
Repeat delay	The repeat delay in the units indicated by the previous property; a value of zero means "do not repeat".
Inject	Specifies the scheme for determining the injected job for this connection: • **Incoming job**: inject the incoming job (or a copy, if more than one connection specify this scheme); if the injection is not triggered by an incoming job this behaves as if *Dummy job* was selected. • **Dummy job**: inject an empty file called *dummy.txt* (generated by the tool). • **Specific job**: inject the job specified in a subordinate property through its absolute file or folder path. • **Job repository**: inject the job specified in a subordinate property through an absolute folder path (the repository containing the jobs) and a job name (the name of the job residing in the repository).
	*The following subordinate properties are present if **Inject** is set to **Specific job**.*

Property	Description
Job path	The absolute file or folder path of the job to be injected (if a fixed file path is selected, the selected file is included in the exported flow).
Delete after injection	If set to *Yes* or if the condition is true, the original injection job is deleted after being injected in the outgoing connection. Otherwise, the original job is unaffected.
	*The following subordinate properties are present if **Inject** is set to **Job repository**.*
Job repository	The absolute folder path of the repository containing the jobs.
Job name	The file or folder name of the job residing in the repository (possibly including the filename extension, depending on the value of the subsequent property).
Extension	The filename extension for the job residing in the repository (without the period); an empty value means that the filename extension is included in the *Job name* property (or that there is no filename extension).
Delete after injection	If set to *Yes* or if the condition is true, the original injection job is deleted after being injected in the outgoing connection. Otherwise, the original job is unaffected.
Name job after	Specifies how to determine the name of the jobs injected into this connection: • **Incoming job**: use the name of the incoming job; if the injection is not triggered by an incoming job this behaves as if "Injection job" was selected. • **Injection job**: use the name of the job selected for injection (which may be the incoming job).

Rename job

Rename job is a processor that provides various mechanisms for renaming the incoming job and/or the files inside a job folder.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Rename job** element are:

- remove
- add
- replace

- filename
- name
- extension
- prefix
- suffix
- regular expression
- regexp

Connections

Rename job allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Affect job name for	Determines for which jobs the rename actions are applied to the name of the job (individual file or job folder): • All jobs • Individual files only (= files not being part of a job folder!) • Job folders only • No jobs
Remember original name	If set to yes, the original filename of the incoming job is stored in private data in the internal job ticket for the job so that it can be restored with a subsequent rename flow element; see *Restoring the original filename* on page 146 Only the name of the job is remembered; not the name of any files inside a job folder
Private data key	The first portion of the private data key used to store the original filename; see *Restoring the original filename* on page 146
Files inside job folder	Determines what to do with files inside a job folder: • Leave alone • Rename files • Rename files and folders • Flatten hierarchy (discarding folders)

Property	Description
	• Flatten hierarchy and rename files
Nested folder levels	Specifies the number of nested subfolder levels to act on (zero means "leave alone"; use a large number to act on all levels)
Resolve collisions	Determines how to resolve situations where two files on the same level end up with the same name (after all other actions specified in this tool have been performed): • Add suffix after filename proper (= filename without extension) • Add suffix after complete filename • Modify name without changing length
Pattern	A pattern for the suffix or replacement string used to resolve collisions; "count" is replaced by a number with an appropriate number of digits (that is, a single digit unless there are many files colliding to the same name)
Action 1	Determines the first rename action taken: • None • Add prefix • Add suffix • Remove segment • Keep segment • Replace • Search and replace • Reduce character set • Remove extension • Add extension • Replace extension
Act on	Determines which portion of the filename is affected: • Filename proper (= filename without extension) • Complete filename (select this if the file has no extension)
Prefix	The prefix to add at the start of the filename
Suffix	The suffix to add at the end of the filename

Property	Description
Start index	The one-based start index of the filename segment to remove/keep
End index	The one-based end index of the filename segment to remove/keep; zero means until the end of the filename
Search for	The search string to be replaced, or a regular expression that matches the string to be replaced
Replace by	The replacement string, or a regular expression that can use the groups captured by the search regexp
Repeat	Determines the repeat behavior of the search/replace: • Once: only the first match is replaced • Consecutive: repeated as many times as needed to reach the end of the filename (however the replaced portion is NOT searched again) • Recursive: consecutive is repeated until the filename no longer changes (with a max. of 99 iterations)
Allowed character set	Determines the allowed character set: • Local8bit: the current ANSI code page on Windows (Latin1 on Western systems); UTF-8 (i.e. anything) on Mac OS X • Portable ASCII: printable 7-bit ASCII less those characters that aren't allowed in filenames on some systems
Replacement character	Determines the replacement for disallowed characters: • Underscore • Space • Remove
New extension	The new filename extension
Action 2 ... Action 5	The subsequent rename actions taken; these properties have the same subordinate properties as the first action property

Restoring the original filename

If the "Remember original name" property is set to yes, the tool stores the original name of the incoming job in the internal job ticket for the job using private data keys as follows:

Private data key	Stored value
<key>	The original filename including extension

Private data key	Stored value
<key>.Name	
<key>.NameProper	The original filename without extension
<key>.Extension	The original filename extension

For example, if the private data key property is left to its default value, the original filename without extension can be retrieved later on with the following variable:

[Job.PrivateData:Key="Original.NameProper"]

The "Remember original name" option works even if all rename actions are set to "none"; this can be useful to capture the job name before it gets changed by some other tool or application.

File type

File type is a processor that sets a filename extension for a file and if applicable its Mac file type and creator type to a specified type.

Job folders are moved along without change.

See also *About Mac file types* on page 39 and *Switch preferences: Mac file types* on page 39.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **File type** element are:

- replace
- filename
- name
- extension

Connections

File type allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element

Property	Description
File type	One of the file types presented by the file type property editor, except for Folder; see also *Specifying file filters* on page 241

Sort job

Sort job is a processor that offers various schemes for sorting incoming jobs across its outgoing connections depending on metadata associated with the jobs.

For each job the tool determines the value of the specified metadata field and compares this value with the names of the outgoing connections. If a match is found, the job is moved along that connection. Otherwise the job is moved along the outgoing data error connection, or if there is no such connection, it is moved to the problem jobs folder.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Sort job** element are:

- metadata
- switch
- route

Connections

Sort job supports outgoing traffic-light connections of the following types:

- Success out: the name of each connection is matched with the value of the job's metadata field; if a match is found, the job is moved along that connection.
- Error out(optional): if no match is found the job is moved along this connection; if there is no such connection, the job is moved to the problem jobs folder.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Scheme	Determines the scheme used to specify a metadata value: • Direct: use variables or a script expression to calculate a value • Location path

Property	Description
	• Key/value pair
Value	The value to be used for sorting the job
Dataset	The name of the metadata dataset to query; Default means the embedded dataset
Data model	The data model used for querying the dataset (one of XMP, JDF, XML); this must match the data model of the dataset except that XML can be specified to query JDF
Location path	The location path pointing at the value to be used for sorting the job (for XML this can be an arbitrary XPath expression)
Array location path	The location path pointing at the array containing the key/value pairs
Key name	The name of the key field
Key contents	The value of the key
Value name	The name of the value field

Log job info

Log job info is a processor that issues a message to the Switch execution log containing the value of the specified metadata field. It is intended mainly for use while testing a flow.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Log job info** element are:

- metadata
- debug

Connections

Log job info allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas

Property	Description
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Message text	The message to be logged; %1 will be replaced by the argument value; if %1 is not present it is added at the end of the string
Message level	Determines the message level: Info, Warning or Debug
Scheme	Determines the scheme used to specify a metadata value: • Direct: use variables or a script expression to calculate a value • Location path • Key/value pair
Value	The value to be logged
Dataset	The name of the metadata dataset to query; Default means the embedded dataset
Data model	The data model used for querying the dataset (one of XMP, JDF, XML); this must match the data model of the dataset except that XML can be specified to query JDF
Location path	The location path pointing at the value to be logged (for XML this can be an arbitrary XPath expression)
Array location path	The location path pointing at the array containing the key/value pairs
Key name	The name of the key field
Key contents	The value of the key
Value name	The name of the value field

Sort files in job

Sort files in job is a processor that provides a mechanism for "sorting" the files inside a job folder, in other words to perform the following two steps:

1. Determine the desired sorting order of the files based on their current filename.
2. Rename the files so that they alphabetically collate in the desired sorting order.

This is useful to prepare the job for tools that process files in alphabetical order, for example merging pages into a single document.

Sort files in job ignores any nested subfolders and their contents (that is, it works only on the files immediately inside the job folder). Individual job files are passed along unchanged.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Sort files in job** element are:

- remove
- add
- replace
- order
- filename
- name
- extension

Connections

Sort files in job allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Sort key 1	Determines the first sort key: • None • Number: the Nth distinct group of consecutive digits • Segment: the segment specified by start index and length • Search: the segment matching a regular expression • Extension: the filename extension
Number index	The one-based index of the intended digit group; automatic means "use the smallest number" of all digit groups
Start index	The one-based start index of the intended filename segment
Length	The length of the intended filename segment; zero means until the end of the filename, excluding extension

Property	Description
Search pattern	A regular expression that matches the intended segment; if there is no match the sort key is empty
Sort as numbers	If set to no, the filename segments specified in the previous properties are sorted as regular text strings If set to yes, the segments are first padded with leading zeroes (to the maximum length in the set) so that they collate as one would expect for numbers (note that this procedure works for hexadecimal numbers in addition to regular decimal numbers) This property setting is irrelevant in case the filename segments all have the same length
Sort key 2	The second and third sort keys; these have the same subordinate properties as the first sort key If two or more filenames have identical sort key values, they are sorted alphabetically
Sort key 3	
Rename scheme	Determines the rename action taken to make files collate: • Add prefix • Add prefix and suppress digits: each digit group in the original filename is replaced by an underscore • Replace filename (leave extension) • Replace filename and extension
Prefix pattern	A pattern for the prefix; "count" is replaced by a number with an appropriate number of digits (depending on the number files)

XSLT transform

XSLT transform is a processor that performs an XSLT 1.0 transformation on the incoming XML file and produces the resulting XML, HTML or text file.

Refer to the XSLT 1.0 specification and to widely available literature about XSLT for more information.

See also *External metadata* on page 428.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **XSLT transform** element are:

- XML
- JDF
- XMP
- HTML
- CSV
- metadata

Connections

XSLT transform allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
XSLT transform	The XSLT transform to be applied to the incoming XML file; this must be a valid XML document representing an XSLT 1.0 style sheet
Output file type	The type of the transformed output file: XML, JDF, XMP, HTML, Text, Log, or CSV

Recycle bin

Recycle bin is a consumer that deletes incoming jobs either immediately or depending on the jobs size, age etc...

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Recycle bin** element are:

- trash can
- remove
- delete

Connections

Recycle bin does not allow outgoing connections.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Path	The path of the Recycle bin's backing folder on disk, or "auto-managed". For more information on "user-managed" versus "auto-managed" folders, refer to *Folder* on page 97.
Keep N jobs	If set to zero, jobs are deleted immediately when they arrive in the Recycle bin (unless another **Keep ... jobs** property applies). If non-zero, the Recycle bin only deletes the jobs when the total number of jobs in the Recycle bin exceeds the given limit (N); the oldest jobs are then deleted until the number of jobs in the Recycle bin is once again under the limit. **Note:** The different "Keep...jobs" properties of the Recycle bin tool are independent; jobs are deleted as soon as they exceed the limit of any of the "Keep ... jobs" properties.
Keep N MB jobs	If set to zero, jobs are deleted immediately when they arrive in the Recycle bin (unless another **Keep ... jobs** property applies). If non-zero, the Recycle bin only deletes the jobs when the total size of all jobs in the Recycle bin exceeds the given limit (N); the oldest jobs are then deleted until the total size of the jobs in the Recycle bin is once again under the limit. **Note:** The different "Keep...jobs" properties of the Recycle bin tool are independent; jobs are deleted as soon as they exceed the limit of any of the "Keep ... jobs" properties.
Keep jobs for N (hours)	If set to zero, jobs are deleted immediately when they arrive in the Recycle bin (unless another **Keep ... jobs** property applies). If non-zero, the Recycle bin only deletes the job after a specific number (N) of hours; any job that is older than the limit is permanently removed from the Recycle bin. **Note:** The different "Keep...jobs" properties of the Recycle bin tool are independent; jobs are deleted as soon as they exceed the limit of any of the "Keep ... jobs" properties.
Move to system recycle bin	If set to **No** (default), jobs moved to the Recycle bin are deleted permanently.

Property	Description
	If set to **Yes**, jobs deleted by the Recycle bin tool are not permanently deleted but instead moved to the system Recycle bin, so they can be recovered if they were deleted by accident. Note that you need to empty the bin regularly, otherwise you'll run out of disk space.
Strip unique name	Only available if *Move to system recycle bin* is set to *Yes*. If set to **Yes**, the unique name prefix added to the filename by Switch is removed before moving the job to the system Recycle bin.

5.1.2.3. Scripting

Script element

Script is a flow element that executes a script program specified by the user to process, produce or consume jobs.

A script flow element can be a processor, producer or consumer depending on the specifications in the attached script declaration. In addition, the script declaration may inject extra properties into the script element and into its outgoing connections. These extra properties serve as arguments to the script program.

For more information on scripting in Switch, refer to the *Scripting documentation on the Enfocus website*.

Keywords

Keywords can be used with the search function above the Flow elements pane.

The keywords for the **Script element** are:

- package
- program
- custom
- plug-in
- plugin
- applescript
- visual basic
- javascript

Script package

A script package is an archive file (with filename extension "sscript") that contains all information about a script. It includes a script declaration, a script program, and possibly an

icon to be displayed in the Switch flow designer instead of the standard script element icon. A script package can be exchanged between users as a single entity.

To assign a new script package (created with SwitchScripter or received from a third-party) to a script element, right-click on the script element in the canvas and select the "Choose script package" menu item, or edit the "Script package" property in the properties editor.

To edit the script package selected in a script element, right-click on the script element in the canvas and select the "Edit script package" menu item. The script package will be opened in SwitchScripter for viewing or editing.

Connections

The type and maximum number of outgoing connections for a script element are determined by the script declaration attached to the script element. Furthermore, the script declaration may cause the script element to inject extra properties into its outgoing connections.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Script package	The Switch script package to be attached to this script element
<Injected>	The script declaration may define extra properties to be injected into the script element as arguments for the script program

5.1.2.4. Communication

HTTP request

HTTP request is a processor that for each incoming job executes an HTTP or HTTPS request. Thus the incoming job is a request trigger and it can be used to define the request specification: URL, authentication data, request parameters, file to upload, etc. The protocol type (HTTP or HTTPS) is automatically detected from the URL: if the URL starts with "https://", HTTPS is used, otherwise HTTP is used.

The server responds to the request by sending something back: an HTML source, JSON or XML data, or a file that is downloaded. The tool provides properties to manipulate this server response. The server response is always saved as a file and the tool can inject this file into the flow as a new job, attach it as metadata dataset to the incoming job or assemble it into a job folder together with the incoming job.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow Elements pane, the **HTTP request** element will be shown in the list:

- HTTP
- HTTPS
- POST
- PUT
- GET
- HEAD
- DELETE
- download
- upload
- request

Connections

HTTP request supports outgoing traffic-light connections:

- The 'Data' connections transfer the server response file as well as the input job (depending on the property values specified for the flow element).
- The 'Log' connections transfer a generated text log file containing the request URL, the finished status, the status code, the status description, the last error and other relevant information. The log file name is generated from the input job file name by replacing the input job extension with 'log'.
- The 'Success out' connections are used in case the request finished status is 'Ok' and the HTTP request status code is in the range 100-299.
- The 'Error out' connections are used in case the request finished status is not 'Ok' or the HTTP request status code is in the range 300-599. The input job may fail in case of some internal tool error or invalid tool settings.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
URL	The URL to fetch. The URL string must be URI-encoded (in a URI-encoded string a space is shown as %20). The tool detects the protocol to use for the request automatically from the URL: if the URL starts with 'https://', the tool will use HTTPS, otherwise HTTP will be used. **Example 1** (entered using the 'Single-line text with variables' editor); assumes the job name can contain only ASCII alphabetic characters and digits: https://api-content.dropbox.com/1/files_put/auto/[Job.Name]

Property	Description
	Example 2 (entered using the 'Script expression' editor): HTTP.encodeURI("https://api-content.dropbox.com/1/files_put/auto/" + job.getName());
Request type	The type of the request. The supported request types are: • PUT (used for uploading data) • GET (used for downloading data) • HEAD (used for retrieving response headers) • POST (used for uploading with extra parameters) • DELETE (used for removing resources on external services) **Note:** The value for the "Content-Type" header in the request is generated automatically depending on the request type and other settings like MIME encoding and defined parameters. In the HTTP request tool, it is not possible to define the custom header value. However in some cases it is possible by writing a script that uses the HTTP class from the Switch scripting API. More details about the automatically generated value for the "Content-Type" header and the ways to specify a custom value for it, can be found in Switch scripting reference.
Attached file	This property is available only if **Request type** is *POST* or *PUT*. A file to append to request if the POST or PUT requests are used. The file will be uploaded to the server.
Use MIME encoding	This property is available only if **Request type** is *POST*. To use MIME encoding, choose **Yes**; otherwise choose **No** (default).
File variable	This property is available only if **Request type** is *POST* and **Use MIME encoding** is *Yes*. The name of the HTTP form data variable that is used by the receiving HTTP server to identify the correct file part of the uploaded MIME package.
Authentication scheme	The authentication scheme to use when server authorization is required. If the property is set to *None* (default), no authentication is performed.

Property	Description
	If this property is set to *Basic*, the **User name** and **Password** properties must be set, and in this case the element will attempt basic authentication. If the authentication scheme is set to *Digest*, *NTLM* or *Negotiate*, digest, NTLM or Negotiate authentication will be attempted instead. If the authentication scheme is set to *Proprietary*, the authorization token must be supplied through the **Authorization** property. If the authentication scheme is set to *OAuth*, the authorization string must be supplied through **Authorization** property.
User name	This property is available only if **Authentication scheme** is *Basic*, *Digest*, *NTLM* or *Negotiate*. A user name if authentication is to be used.
Password	This property is available only if **Authentication scheme** is *Basic*, *Digest*, *NTLM* or *Negotiate*. A password if authentication is to be used.
Authorization	This property is available only if **Authentication scheme** is *Proprietary* or *OAuth*. The authorization string to be sent to the server.
Parameters	The parameters to attach to the request. Each parameter should be specified in a separate line by the string 'key=value' (without quotes). The parameters are URI-encoded automatically. For the POST and PUT requests, the parameters are included in the HTTP request after the HTTP headers. For the HEAD and GET requests, the parameters are appended to the URL after the question mark ('?'). **Example:** root=auto path=[Job.JobState]
Headers	The headers to attach to the request. Each header should be specified on a separate line by the string **key:value**. Example: Content-Type : text/plain
Response	The response received from the server is always saved to a file. This property defines how to handle this file: • *Inject as new job*: the response is sent to the output data connections as a new job.

Property	Description
	• *Attach as dataset*: the response is attached to the input job as an opaque dataset with the name specified in the 'Dataset name' property ('HTTPResponse' by default) and then the input job is sent to the output data connections. • *Assemble in jobfolder*: the response is assembled into a new jobfolder together with the input job and the jobfolder is sent to the output data connections. The jobfolder name is the same as the name of the input job (without the extension). • *Discard*: the response is discarded. In this case the input job is sent to the output data connections.
Dataset name	This property is a subordinate property of **Response** if it is set to *Attach as dataset*; it allows to specify a custom name for the dataset.
File Name	This property is available only if **Response** is *Inject as new job* or *Assemble in jobfolder*. The file name (with an extension) to use for the response file. *Automatic*: The tool will attempt to determine the file name from the Content-Disposition header of the server response. If the Content-Disposition header is missing or does not contain a valid file name, the tool will use the default file name "Response".
Input job	This property is available only if **Response** is *Inject as new job*. Defines what to do with the input job in case the response file is injected as a new job: • *Send to output*: the input job is sent to the output data connections as a separate job. In other words, the input job and the response file are now two separate jobs. • *Attach as dataset*: if the input job is a file, it is attached as an opaque dataset with the name specified in the 'Dataset name' property ('HTTPInput' by default) to the new job representing the response file. If the input job is a folder then it is discarded and an error message is logged. **Note:** If "Attach as dataset" is chosen, you'll get an extra subordinate property (*Dataset name*) allowing you to specify a custom name for the dataset.

Property	Description
	• *Discard*: the input job is discarded.
Response headers	This property defines how to handle the response headers: • *Attach as dataset*: the response headers are saved to a text file (each header on a separate line in format 'key:value') and the file is attached to the output job as an opaque dataset with the name specified in the 'Dataset name' property ('HTTPResponseHeaders' by default). • *Discard*: the response headers are discarded.
Dataset name	This property is a subordinate property of Response headers if it is set to *Attach as dataset*; it allows to specify a custom name for the dataset.

Webhook

Webhook is a producer that subscribes to specific incoming HTTP requests and injects the received request content as a new job in the flow. The job file name is 'playload' and the file extension is automatically generated from the 'Content-Type' header.

You can add this tool to your flow to accept notifications via HTTP/HTTPS protocol. The sender of the notifications needs to know the URL that has the following format:

<protocol type>://SwitchServerAddress:<port>/<path>

Example: https://switchserver:8081/test/notify

The protocol and the port must be properly configured in the *Webhooks* category of the Switch preferences.

Note: With this flow element, periodic calls to third-party systems or services (such as an MIS or CRM system) to check for changes are no longer needed. Instead, these systems will now call Switch the moment something has changed (for example, a new order that has been entered), and this will trigger Switch to do something (for example, to create a new job based on this new order).

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow Elements pane, the **Webhook** element will be shown in the list:

- Webhook
- HTTP
- HTTPS
- POST
- PUT

- DELETE
- URL
- request

Connections

Webhook does not support any incoming connections.

Webhook requires one outgoing connection.

Properties

Property	Description
Protocol type	Defines the protocol. Options are: • Any (default) • HTTP • HTTPS
Request method	Defines the request method. Options are: • Any (default) • POST • PUT • DELETE
Path	Defines the URL path. This a mandatory field. **Example:** 'test/notify'
Request metadata	Defines how to handle the request metadata like arguments, path, headers. Options are: • **Discard**: The request metadata is discarded. • **Inject**: The request metadata will be injected as a new job that is the file in JSON/XML format. • **Attach as dataset**: The request metadata will be attached as dataset with the name specified in the *Dataset name* property ('Webhook' by default) to the outgoing job.
Format	*This option is only available if Request metadata is set to Inject.* Defines metadata file format: JSON(default) or XML

Property	Description
Make job folder	*This option is only available if Request metadata is set to Inject.* • If set to Yes, a job folder is injected • If set to No, the files are injected as separate jobs
Model	*This option is only available if Request metadata is set to Attach as dataset.* This option defines the dataset model: XML or Opaque (default). If Opaque is selected, the dataset file will be in JSON format.
Dataset name	*This option is only available if Request metadata is set to Attach as dataset.* This option allows you to specify the name of the dataset.

Note: This tool does not perform any HTTP authentication.

FTP receive

FTP receive is a producer that downloads jobs from an (S)FTP site and injects them into the flow. The syntax is similar to the syntax of a Submit hierarchy.

If your system environment requires (S)FTP connections to pass through a proxy server, you need to set up the FTP proxy preferences to provide Switch with the configuration details of the proxy server. See *Switch preferences: FTP proxy* on page 37.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **FTP receive** element will be shown in the list:

- Internet
- web
- FTP
- SFTP
- network
- communication
- transfer
- input
- download

Connections

FTP receive does not allow incoming connections.

FTP receive injects folder filter properties into its outgoing connections so that it is possible to include/exclude certain subfolders in the incoming job folders for particular connections. Also see the "skip folders" property described below.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Server type	Select **FTP** or **SFTP**. • If you select **FTP**, you have to set the subordinate property *Passive mode* (see further). • If you select **SFTP**, you have to choose the preferred *Authentication method* (see further).
Passive mode	*Only available if server type = FTP* If set to **Yes**, FTP receive uses passive mode to communicate with the FTP server; otherwise it uses active mode.
Authentication method	*Only available if server type = SFTP* You have two options: • **Password**: Switch logs on to the server with the user name and password filled in below. • **Public key**: Switch logs on to the server using key pairs (public key + private key) which can be generated with the PuTTY Key Generator. The public key is the key used on the server, which must be configured to use public key configuration. The private key is the key used by Switch. You must set the following subordinate properties: • **Certificate store type**: Format in which the key was saved. **Note:** If you want to use a PGP file (that is a PuTTY key file) as the key file for the SFTP server, you first need to convert it into a PEM file (=file type that is supported by the FTP tools in Switch). To perform the conversion, you can use the PuTTY Key Generator: open the PuTTY key file in the utility and then export it, using the main

Property	Description
	menu item **Conversions** > **Export OpenSSH key**. • **Certificate store path**: Full path to the certificate file, which contains the private key. • **Certificate store password**: Password used to save and encode the generated keys. If no password was used, this field should remain empty. **Note:** Alternatively, you can set the authentication method when selecting the FTP directory (See the **FTP directory** property: click > and **Choose FTP directory**).
User name	The login name for the (S)FTP server. For anonymous login, use "anonymous" as user name. **Note:** If you're using the (S)FTP proxy protocol, append an @ sign and the target (S)FTP site address (domain or IP address) to the regular user name (<ftpserverusername>@<ftpserveraddress>).
Password	The password for the (S)FTP server. For anonymous use, enter an e-mail address as password. This property is not available if you have chosen for Public key as authentication method for the SFTP server.
FTP server address	The URL or IP address of the (S)FTP server from which jobs are to be retrieved. **Note:** If you're using the (S)FTP proxy protocol, this should be the URL or IP address of the proxy server.
Port	The port used by the (S)FTP server.
FTP directory	The directory on the (S)FTP site from which jobs are to be retrieved. If the path starts with a forward slash "/", it is relative to the user's home directory. If the path starts with a double forward slash, it is relative to the (S)FTP site's system root. This is only useful if the user has access to the complete file system on the (S)FTP site.
Leave originals on server	If set to **Yes**, incoming jobs are left untouched on the FTP site; Switch never writes to the site so read-only access

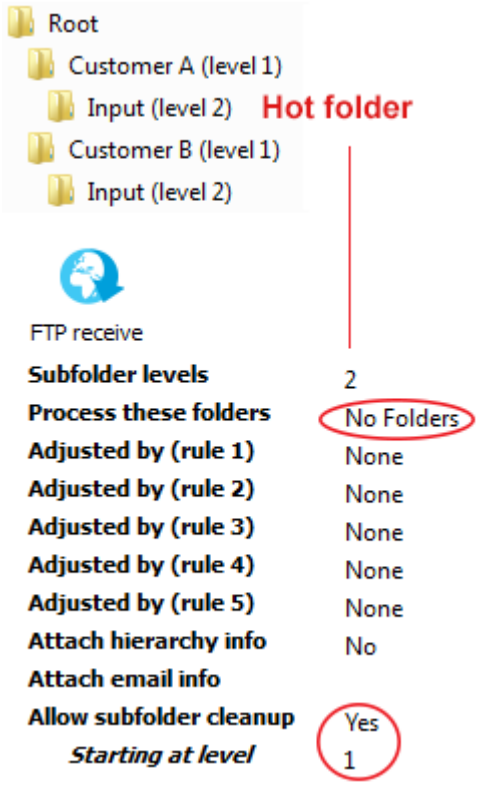
Property	Description
	rights suffice; see *Leaving originals in place* on page 229 for more details If set to **No** (default), incoming jobs are removed from the FTP site; Switch needs full access rights to rename, create and remove files and folders on the FTP site.
Ignore updates	*The **Ignore updates** option is available only if **Leave originals on server** is set to **Yes**.* If set to **Yes**, a job will only be processed once, regardless of any changes to the file size or modification date. This can be used for workflows where the input job is replaced by the processing result, to avoid triggering endless loops. If set to **No**, the job will be reprocessed when its file size or modification date is different. This allows processing jobs which have the same file name as previously submitted jobs.
Minimum file size (KB)	Used to set the minimum file size (in KB) limit before Switch picks up the files or folders. To set no limits, leave it empty.
Check every (minutes)	The frequency of checking the FTP directory for new jobs.
Time-of-day window	If set to **Yes**, the tool checks for new arrivals only during a certain time of the day (specified in the subordinate properties).
Allow from (hh:mm)	The time-of-day window during which to check for new arrivals; the values are structured as "hh:mm" (hours, minutes) indicating a time of day on a 24 hour clock; an empty value means midnight; two identical values mean that the tool always detects jobs.
Allow to (hh:mm)	
Day-of-week window	If set to **Yes**, the tool checks for new arrivals only during certain days of the week (specified in the subordinate properties).
Allow from	The days of the week (Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday) during which to check for new arrivals; two identical values mean that the tool only checks for new arrivals on that specific day.
Allow to	
Day-of-month window	If set to **Yes**, the tool checks for new arrivals only during a certain day of the month (specified in the subordinate properties).
Day	The day in the month during which to check for new arrivals, as a number in the range [1 . . 31]; the default value of one means the first or the last day of the month (depending on the following property).

Property	Description
Relative to	Determines whether the day of the month is relative to **Start of month** or **End of the month**.
Subfolder levels	The number of nested subfolder levels considered to be hot folders (as opposed to job folders); see also the description on subfolders earlier.
Process these folders	Defines the initial set of folders that should be processed. This set can be adjusted by defining rules in the subsequent properties.

Adjusted by (rule 1) .....(rule 5)	This property defines a rule for adjusting the set of folders to be processed, by including or excluding folders matching or not matching a folder name. Different rules can be applied and will be processed in the order as they are specified.
	Additional properties for this rule are:
	• The **Folder name** used for matching.
	• The **Levels**, limiting the range of subfolder levels on which the rule applies.
	• A **Restriction**, based on the folder name of the parent or ancestors for the folder. If folder Y contains subfolder X; Y is X's parent folder. If folder Z contains subfolder Y; Z is one of X's ancestors. The folder that contains folder Z is also one of X's ancestors, and so on.
	• **Nesting**, defining whether this rule operates on subfolders of the target folder, which are deeper in the hierarchy than the defined level range. The matching rule is also applied on these subfolders.
	Options:
	  • **Exclude/Include nested subfolders as well**
	  • **Don't exclude/include nested subfolders**

Attach hierarchy info	If set to **Yes**, (part of) a job's submit location is added to its hierarchy location path as it is submitted in the flow; see *Using hierarchy info* on page 232 for more details.
Include FTP name	Only available if **Attach hierarchy info** is enabled. If set to **Yes**, the name of the flow element is included at the top of the remembered location path.
Include subfolder levels	Identifies the number of hierarchy segments in the hierarchy information.

Property	Description
Save top subfolders	If set to **Yes**, the top-most subfolders are remembered in the location path, otherwise the bottom-most subfolders are remembered.
Attach email info	E-mail addresses and body text specified with the editor for this property are added to each job's e-mail info as the job is injected in the flow; the information added can vary depending on the subfolder in which the job was located; see *Using email info in Switch* on page 233 for more details.
Allow subfolder cleanup	If set to **Yes**, empty subfolders in the hot folder will be removed starting from the level defined in the next property (*Starting at level*). **Note:** This option is useful if **Process these folders** is set to **No Folders** (see higher), because in that case only *files* are taken from the FTP, while (empty) folders are left.
Starting at level	The folder level (inside of the hot folder) where the folder cleanup should start: • Level 1 deletes all empty subfolders in the hot folder • Level 2 deletes all empty subfolders of subfolders of the hot folder • etc. In the example below, empty subfolders in the hot folder (= Input (level2)) will be removed.

Property	Description
	

FTP send

FTP send is a processor (although conceptually it is a consumer) that uploads any incoming jobs to an (S)FTP site.

If your system environment requires (S)FTP connections to pass through a proxy server, you need to set up the (S)FTP proxy preferences to provide Switch with the configuration details of the proxy server. See *Switch preferences: FTP proxy* on page 37.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **FTP send** element will be shown in the list:

- Internet
- web
- FTP
- SFTP
- network
- communication

- transfer
- output
- upload

Connections

FTP send supports optional outgoing connections to provide in-flow feedback about the operation and to keep the job around without extra copying. This allows multiple send operations to be chained in an intelligent manner; for example:

- Successively upload the same job to multiple (S)FTP sites.
- Provide a fallback operation when an upload fails (for example, upload to a secondary site).
- Send an email with the URL of a job that was successfully uploaded to an (S)FTP site.

FTP send supports traffic-light connections of the following types (other types are not allowed):

- Data error: carries the incoming job if the operation fails at the first attempt; if there are no data error connections the tool keeps retrying the operation as specified in the user preferences.
- Data success: carries the incoming job after the operation succeeds; if there are no data success connections the output is simply suppressed (without logging a warning or error).
- Log success: carries a small log file in XML format after the operation succeeds; if there are no log success connections the output is simply suppressed. The log file contains relevant information about the operation such as destination, time sent, transfer time, list of files, etc. See *Processing results schema* on page 435.
- Data with log success: carries both the job and the log file (as metadata), allowing access to the results of the operation through variables or scripting.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Server type	Select **FTP** or **SFTP**. • If you select **FTP**, you have to set the subordinate property *Passive mode* (see further). • If you select **SFTP**, you have to choose the preferred *Authentication method* (see further).
Authentication method	*Only available if server type = SFTP* You have two options: • **Password**: Switch logs on to the server with the user name and password filled in below. • **Public key**: Switch logs on to the server using key pairs (public key + private key) which can be generated with the PuTTY Key Generator.

Property	Description
	The public key is the key used on the server, which must be configured to use public key configuration. The private key is the key used by Switch. You must set the following subordinate properties: • **Certificate store type**: Format in which the key was saved. • **Certificate store path**: Full path to the certificate file, which contains the private key. • **Certificate store password**: Password used to save and encode the generated keys. If no password was used, this field should remain empty. **Note:** Alternatively, you can set the authentication method when selecting the FTP directory (See the **FTP directory** property: click > and **Choose FTP directory**).
Passive mode	*Only available if server type = FTP* If set to **Yes**, FTP receive uses passive mode to communicate with the FTP server; otherwise it uses active mode.
User name	The login name for the (S)FTP server. For anonymous login, use "anonymous" as user name. **Note:** If you're using the (S)FTP proxy protocol, append an @ sign and the target FTP site address (domain or IP address) to the regular user name (<ftpserverusername>@<ftpserveraddress>).
Password	The password for the (S)FTP server. For anonymous use, enter an email address as password. This property is not available if you have chosen for Public key as authentication method for the SFTP server.
FTP server address	The URL or IP address of the (S)FTP server to which the jobs are to be delivered. **Note:** If you're using the (S)FTP proxy protocol, this should be URL or IP address of the proxy server.
Port	The port used by the (S)FTP server.
FTP directory	The directory on the (S)FTP site to which jobs are to be delivered.

Property	Description
	If the path starts with a forward slash "/", it is relative to the user's home directory. If the path starts with a double forward slash, it is relative to the (S)FTP site's system root. This is only useful if the user has access to the complete file system on the (S)FTP site.
Subfolder levels	The number of nested subfolder levels in the uploaded folder hierarchy (similar to the behavior of the Archive hierarchy tool). When this property is set to zero (default value) all jobs are placed immediately inside the (S)FTP directory specified in the previous property.
Strip unique name	If set to **Yes**, the unique name prefix added to the filename by Switch is removed before placing the job in the FTP hierarchy; the default is to strip the prefixes from jobs deposited in a FTP hierarchy - leaving the prefixes in place avoids overwriting a previously deposited job with the same name.
Duplicates	Determines what happens when **Strip unique name** is set to **Yes** and a job arrives with the same name and location as a job already residing on the (S)FTP site: • **Overwrite**: replace the existing job with the new one – this is the default behavior. • **Keep unique name**: preserve the new job's unique name prefix, leaving the existing job untouched (without unique name prefix). • **Add version number**: add an incrementing version number at the end of the filename body for the new job ("2", "3", ... "9", "10", "11"), leaving the existing job untouched. *For example, "job.pdf" will become "job1.pdf"," job2.pdf", ...* Optionally, you can add a **separator** between the filename body and the version number, for example an underscore. *In that case, e.g. "job.pdf" will become "job_1.pdf"," job_2.pdf", ...* By default, the **Separator** property is empty. You can also determine the **width** of the version number, i.e. the number of digits used for the version number. For example, if Width is set to "5", the version number will consist out of 5 digits (e.g. job_00001.pdf), meaning that leading zeros will be added as required. • **Fail**: move the new job to the problem jobs folder, leaving the existing job untouched.

Mail receive

Mail receive is a producer that retrieves email messages from a POP3 and IMAP email server (so that users can access email accounts like Gmail, Hotmail etc) and injects any file attachments into the flow. Please note that Switch only accepts MIME encoded attachments.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow Elements pane, the **Mail receive** element will be shown in the list:

- Internet
- web
- email
- e-mail
- POP3
- IMAP
- network
- communication
- transfer
- input

Connections

Mail receive does not allow incoming connections.

Mail receive allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Server type	The type of server from which to retrieve mail. Choices are **POP3** and **IMAP4**.
Server address	The URL or IP address of the server from which to retrieve mail.
Port	Editors in this property are numbers and it is empty by default.
Accounts	A list of accounts (names and corresponding passwords) from which to retrieve mail.

Property	Description
Use secure password verification	Defines whether to log in to the mail server using secure password verification. The following secure authentication schemes are supported: **POP protocol:** • NTLM • CRAM-MD5 • APOP • SASL DIGEST-MD5 • SASL Plain **IMAP protocol:** • NTLM • CRAM-MD5 • SASL DIGEST-MD5 • SASL Plain
Server requires secure connection	Defines whether the mail server requires a secure connection using the TLS protocol.
Leave originals on server	If set to **Yes**, incoming messages are left untouched on the server. If set to **No** (default value), incoming messages are removed from the server; see also *Leaving originals in place* on page 229.
Check every (minutes)	The frequency of checking the email accounts for new messages.
Time-of-day window	If set to **Yes**, the tool checks for new arrivals only during a certain time of the day (specified in the subordinate properties).
Allow from (hh:mm)	The time-of-day window during which to check for new arrivals; the values are structured as "hh:mm" (hours, minutes) indicating a time of day on a 24 hour clock; an empty value means midnight; two identical values mean the tool always checks for new arrivals.
Allow to (hh:mm)	
Day-of-week window	If set to **Yes**, the tool checks for new arrivals only during certain days of the week (specified in the subordinate properties).
Allow from	The days of the week (Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday) during which to check for new arrivals; two identical values mean the tool only checks for new arrivals on that specific day.
Allow to	

Property	Description
Day-of-month window	If set to **Yes**, the tool checks for new arrivals only during a certain day of the month (specified in the subordinate properties).
Day	The day in the month during which to check for new arrivals, as a number in the range [1 . . 31]; the default value of one means the first or the last day of the month (depending on the following property).
Relative to	Determines whether the day of the month is relative to **Start of month**' or **End of the month**.
Attach hierarchy info	If set to **Yes**, information about a file's origin (derived from the email message as specified by the next property, see below) is added to its internal job ticket as a location path; see *Using hierarchy info* on page 232 for more details.
Base info on	Defines how to derive the attached location path from the email message; the path can be based on the contents of one of the following: "Sender's email address", "Email account name", or "Message subject".
Attach email info	If set to **Yes**, the sender's address of the incoming email message is added to the email information in the file's internal job ticket; body text from the incoming message is never copied into the email info; see *Using email info in Switch* on page 233 for more details.
Attach extra email info	If set to **Yes**, additional email info is added to the internal job ticket as specified by the next two properties (see below); the information added can vary depending on properties of the incoming email message (see below); see *Using email info in Switch* on page 233 for more details.
Base map key on	Defines the "key" that is used to select the appropriate email info from the table provided in the next property; the key can be contents of: "Sender's email address", "Email account name", or "Message subject".
Email info map	Email addresses and body text specified with the editor for this property are added to each file's email info as the file is injected in the flow; the value of the key specified in the previous property (for example, the sender's address of the incoming email message) determines which entry of the table is actually added.
Scan for nested attachments	When set to **Yes**, user can scan all nested email until no emails but real assets are found. The default value is **No**.
Collect attachments	Set to **Yes** to collect all attachments in a folder. Single file attachments will also be stored in a job folder. The default value is **No**.

Property	Description
Assemble message and attachments	This is a sub property of Collect attachments and is available only when the parent is set to **Yes**. Set to **Yes** to assemble the injected message and the attachment(s) in the same job folder. If there is no message to inject, this property will not affect attachment handling. The default value is **No**.
Inject message as file	Determines whether the email message itself (as opposed to its attachments) is injected into the flow as a separate file. Choices are: • **No**: Only attachments are injected in the flow. • **If no attachments**: The mail message is injected as a separate file only if it has no attachments. • **Always**: The mail message is always injected as a separate file. The message will be saved as HTML or TXT with UTF8 encoding, depending on the value of the **Convert HTML to plain text** property. The file will be named after the subject line of the email message. If there is no subject line, the file will be named 'No subject.txt' or 'No subject.html'.
Convert HTML to plain text	If set to **Yes**, the HTML message body will be converted to plain text before it is used to generate output data. If set to **No**, the message body will remain in HTML format. The message body can be injected into the flow as a new job or attached as metadata to the jobs generated by the incoming email (for example, jobs representing e-mail attachments).

Picking up e-mail metadata

The **Mail receive** tool automatically picks up the contents of incoming email messages as metadata. This behavior cannot be configured or turned off (that is, there are no flow element properties related to this behavior). See *Picking up metadata* on page 429 for more background information.

For each incoming message the **Mail receive** tool creates a metadata dataset that contains the relevant components of the message, such as the sender, to, cc, and reply-to addresses and the complete email body text. This dataset is then associated with the job ticket for all files delivered by the message under the standard dataset name "Email".

Refer to *Email message schema* on page 434 for details on the format of the generated metadata.

Mail send

Mail send is a processor (although conceptually it is a consumer) that sends an e-mail message to an SMTP e-mail relay server for each incoming job.

Some properties for this tool (such as the SMTP server details) must be set up in the global user preferences, since these values are the same for all outgoing email. For more information, refer to *Switch preferences: Mail send* on page 36.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Mail send** element will be shown in the list:

- Internet
- web
- email
- e-mail
- SMTP
- network
- communication
- transfer
- output

Connections

Mail send supports optional outgoing connections to provide in-flow feedback about the operation and to keep the job around without extra copying. This allows multiple send operations to be chained in an intelligent manner; for example:

- Successively mail and FTP the same job.
- Provide a fallback operation when a mail operation fails.

Mail send supports traffic-light connections of the following types (other types are not allowed):

- Data error: carries the incoming job if the operation fails at the first attempt; if there are no data error connections the tool keeps retrying the operation as specified in the user preferences.
- Data success: carries the incoming job after the operation succeeds; if there are no data success connections the output is simply suppressed (without logging a warning or error).
- Log success: carries a small log file in XML format after the operation succeeds; if there are no log success connections the output is simply suppressed. The log file contains relevant information about the operation such as destination, time sent, transfer time, list of files, etc. See *Processing results schema* on page 435.
- Data with log success: carries both the job and the log file (as metadata in a dataset), allowing access to the results of the operation through variables or scripting.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.

Property	Description
Subject	The subject line for the message.
To addresses	The list of destination email addresses for the message. Email addresses are separated by a semicolon or by a newline.
Include attached addresses	If set to **Yes**, the email addresses from the job's internal job ticket are added to the To addresses. For more information about attached email info, refer to *Using email info in Switch* on page 233.
CC addresses	A comma/semicolon/newline separated list of carbon-copy email addresses for the message.
BCC addresses	A comma/semicolon/newline separated list of blind carbon-copy email addresses for the message.
SMTP server authentication	Authentication parameters for the SMTP server. Remember that the SMTP server address must be defined in the Switch preferences (*Mail send* category). If you want to use the sender specified in the Switch preferences (*Mail send* category), choose **Default**. If you want to use a different sender (as specified in the Sender address and Sender name field), make sure to choose **Custom** and enter the user name and password linked to this sender. • *User name*: The login name for the SMTP server, for example: user@gmail.com. Leave empty if none is required. • *Password*: The password for the SMTP server. Leave empty if none is required.
Sender name	The sender's name for outgoing email messages. If the value is empty or set to **Default**, the sender name specified in the Switch preferences (*Mail send* category) will be used. If you want to use a different sender, enter the name of your choice and do not forget to specify the custom SMTP authentication parameters.
Sender address	The sender's email address for outgoing email messages. If the value is empty or set to **Default**, the sender address specified in the Switch preferences (*Mail send* category) will be used. If you want to use a different sender, enter the email address of your choice and do not forget to specify the custom SMTP authentication parameters.
Reply address	The email address(es) to which reply messages will be sent to. If the value is empty or **Default**, the sender address specified in the Sender address field is used (i.e. to the address that was used to send mails).

Property	Description
	Note: The value of this property is used in the **Reply-To** SMTP header that is normally used by email client applications to send a reply. However, the **From** field of an email in the client application does not display this address, instead it shows the sender address specified in the Sender address field.
Message format	The format of the message body, either **Plain text** or **HTML**. When set to HTML, the email message has two bodies. The first is in HTML format and the second is a plain text version of the HTML message.

Body template	The location of the template of the email body.
	• If set to **Built-in**, the text can be set in the *Body text* property. Using the *Include attached body text* option, you can insert the body text attached to the job as part of its email info, after the body text.
	• If set to **Fixed file**, a *Template file* can be set, referring to a plain text or HTML file containing the template for the message body.
	  • A *plain text* body template must be a regular text file (preferred extension ".txt") using Unicode (UTF-16 with proper BOM or UTF-8). Other text encodings are not allowed.
	  • An *HTML* body template must be a valid HTML file (preferred extension ".html") using Unicode UTF-8. The HTML file must contain a tag specifying that it uses UTF-8 encoding. Other text encodings (including UTF-16) are not allowed.
	  An HTML body template should not refer to any local resources (since these will not be transmitted with the mail message). Any references (including images) should point to public resources on the worldwide web.
	  You can use Enfocus Switch variables in a plain text template or an HTML template. An example with variables you could use in your own template:
	  `<span>Job size: [Job.ByteCount]</span>`
	  `<span>Flow name: [Switch.FlowName]</span>`
	  `<span>Current date: [Switch.Date]</span>`
	  For more information on variables, refer to *Known variables* on page 402
	  A **sample HTML template** is available at: *http://www.enfocus.com/manuals/Extra/Switch/mailtemplate.html*.
	• If set to **Associated with job**, the *Template dataset* (name of the metadata dataset associated with the job containing a plain text or HTML template) can be set. For more information about attached email info, refer to *Using email info in Switch* on page 233.

Attach files	If set to **Yes**, the incoming file or job folder is compressed (zipped) and attached to the email message being sent.

Property	Description
Strip unique name	If set to **Yes**, the unique name prefix added to the filename by Switch is removed before emailing the job; the default is to strip the prefixes from jobs before emailing them This property affects both the actual attachments and the names of the jobs listed in the email body.

Submit point

Submit point is a producer that serves to submit jobs into a flow through the Switch Web Portal by a user with the appropriate access rights. See also *Designing flows for use with the Switch Web Portal* on page 335.

The backing folder for a Submit point is always auto-managed.

Note: You can only use the Submit point flow element, if you have licensed the SwitchClient and/or the Switch Web Services module.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Submit point** element will be shown in the list:

- Internet
- web
- network
- communication
- transfer
- input
- client
- user
- upload
- metadata
- workstation

Properties

Property	Description
Name	The name of the flow element displayed in the canvas. By default it is displayed as "Submit point".
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.

Property	Description
Display name	The name to be displayed on the Switch Web Portal. If set to **Default**, the name entered in the Name field is displayed.
Thumbnail	The image to be used as thumbnail for this Submit point on the Switch Web Portal (in the top left corner of the dialog). Allowed image types are PNG, BMP and JPEG.
Attach hierarchy info	If set to **Yes**, part of a job's submit information (as configured with the next two properties) is added to its hierarchy location path as it is injected in the flow; see *Using hierarchy info* on page 232 for more details.
Include Submit point name	If set to **Yes**, the name of this flow element is included at the top of the remembered location path.
Include user name	If set to **Yes**, the name of the user submitting the job is included in the remembered location path.
Attach user as email info	If set to **Yes**, the submitting user's e-mail address is added to each job's email info as the job is injected in the flow; see *Using email info in Switch* on page 233.
Attach extra email info	E-mail addresses and body text specified with the editor for this property are added to each job's email info as the job is injected in the flow; the information added can vary depending on the user submitting the job; see *Using email info in Switch* on page 233.
Enter metadata	If set to **Yes**, the user is asked to complete metadata fields before submitting a job; see *Picking up metadata* on page 429 and *Defining metadata fields* on page 437 for more information.
Metadata fields	Definitions for the metadata fields to be entered; see *Defining metadata fields* on page 437 for more information.
Dataset name	A name for the set of metadata entered here; see *Picking up metadata* on page 429 for more information.

Picking up client fields as metadata

The Submit point tool picks up metadata fields entered by the user when submitting a job (through the Switch Web Portal). Specifically, when a user submits a job and the list of field definitions in the Submit point's "Metadata fields" property is not empty, the Submit point:

- Creates a metadata dataset containing the contents of the metadata fields entered by the user.
- Associates this dataset with the job ticket for the submitted job under the dataset name specified in the "Dataset name" property.

Refer to *Client fields schema* on page 442 for details on the format of the generated metadata.

Checkpoint

Checkpoint is a processor that holds jobs for human intervention. A user with the appropriate access rights can review jobs in a Checkpoint through the Switch Web Portal and redirect them along any of the Checkpoint's outgoing connections.

The name shown to the user for each outgoing connection is the name of the connection, or if it is empty, the name of the target folder.

The backing folder for a Checkpoint is always auto-managed.

See also *Designing flows for use with the Switch Web Portal* on page 335.

Note: You can only use the Checkpoint flow element, if you have licensed the SwitchClient and/or the Switch Web Services module.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Checkpoint** element will be shown in the list:

- Internet
- web
- network
- communication
- transfer
- interact
- client
- user
- route
- approve
- metadata

Connections

Checkpoint allows any number of outgoing move connections.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas. Default value is "Checkpoint".
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.

Property	Description
Allow multiple outputs	If set to **Yes**, the user can send copies of a job along more than one outgoing connection; otherwise the job is sent along exactly one of the outgoing connections.
Enable report viewing	If set to **Yes**, the user gets extra buttons to view or save a report obtained by retrieving the metadata dataset named in the property described below. This feature is most often used with datasets picked up through a traffic-light connection by setting "Carry this type of files" to "Data with log".
Report dataset name	The metadata dataset name for the report to be viewed by the client.
Allow replacing or editing job	If set to **Yes**, an extra button is available allowing the user to edit and/or replace jobs with a new version (presumably edited on the client user's computer) before moving it out of the Checkpoint; the original job is lost, but its metadata is preserved.
Enter and display metadata	If set to **Yes**, you can specify or display optional or required metadata fields a user needs to review, update or fill in before allowing the job to go through this Checkpoint.
Metadata fields	Specify the metadata fields a user needs to review, update or fill in. Click this ... button to invoke the **Define metadata fields** dialog box where you can specify the metadata fields. For a full description, refer to *Defining metadata fields* on page 437.
Dataset name	The name of the dataset in which the specified metadata fields will be stored is entered here; see *Picking up metadata* on page 429 for more information.
Attach user as email info	If set to **Yes**, the handling user's e-mail address is added to each job's e-mail info as the job is moved along the flow. In addition, the Checkpoint updates the "user name" attribute in the internal job ticket as follows: • If this property is set to **Yes**, the "user name" attribute is always set to the name of the Checkpoint client user moving the job along, regardless of its previous value. • If this property is set to **No**, the "user name" attribute is set to the new name only if it was empty to begin with.
Fail jobs after timeout	If set to **Yes**, jobs are failed after residing in the Checkpoint for a certain period of time (specified in the subordinate properties).

Property	Description
	Failed jobs are moved to the outgoing connection specified in the subordinate properties or to the problem jobs folder.
Unit	Selects the unit for the subsequent property: Minutes, Hours, Days
Timeout delay	The timeout delay in the units indicated by the previous property (0 means 'no timeout')
Fail connection	The name of the connection to which failed jobs must be moved. If this property value is empty or if the specified name doesn't match any of the outgoing connection names, failed jobs are moved to the problem jobs folder.

Picking up client fields as metadata

The Checkpoint tool picks up metadata fields entered by the user when moving along a job. Specifically, when a user moves along a job residing in a Checkpoint and the list of editable field definitions in the Checkpoint's "Metadata fields" property is not empty, the Checkpoint creates a metadata dataset and associates it with the job's job ticket under the specified dataset name.

Note that a Checkpoint always creates a completely new dataset, i.e. it does not update or modify an existing dataset (even if the job was previously moved through the same or another Checkpoint). If the job already has dataset association with the same name, the reference to the old dataset is removed and replaced by the new one.

Refer to *Client fields schema* on page 442 for details on the format of the generated metadata.

Checkpoint via mail

Checkpoint via mail is a processor that allows implementing a simple Checkpoint via e-mail, performing the following main functions:

- For each arriving job, send out an e-mail message that includes the unique name prefix of the job and a list of possible "Checkpoint actions" (the names of the outgoing connections, or, if no name is specified, the name of the target folders) – in addition to instructions on how to operate the Checkpoint by return e-mail.
- Monitor e-mail messages coming back from users and parse those messages for the original information about the job and for the Checkpoint action selected by the sender.
- When a matching response comes in, move the corresponding job along the specified outgoing connection or (if no name is specified for the connection) to the specified target folder.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Checkpoint via mail** element will be shown in the list:

- Internet

- web
- email
- e-mail
- network
- communication
- transfer
- interaction
- client
- user

Connections

Checkpoint allows any number of outgoing move connections. Each connection defines a "Checkpoint action".

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Subject	The subject line for the message that will be sent as soon as a job arrives in the folder just before the **Checkpoint via email** tool in the flow.
To addresses	The list of destination e-mail addresses for the message. E-mail addresses are separated by a semicolon or by a newline. The to address typically contains the email address of the customer who has to take a decision (e.g. accept or refuse the file).
Include attached addresses	If set to **Yes**, the email addresses from the job's internal job ticket are added to the To addresses. For more information about attached email info, refer to *Using email info in Switch* on page 233.
SMTP server authentication	Authentication parameters for the SMTP server. Remember that the SMTP server address must be defined in the Switch preferences (*Mail send* category). If you want to use the sender specified in the Switch preferences (*Mail send* category), choose **Default**. If you want to use a different sender (as specified in the Sender address and Sender name field), make sure to choose **Custom** and enter the user name and password linked to this sender.

Property	Description
	• *User name*: The login name for the SMTP server, for example: user@gmail.com. Leave empty if none is required. • *Password*: The password for the SMTP server. Leave empty if none is required.
Sender name	The sender's name for outgoing email messages. If the value is empty or set to **Default**, the sender name specified in the Switch preferences (*Mail send* category) will be used. If you want to use a different sender, enter the name of your choice and do not forget to specify the custom SMTP authentication parameters.
Sender address	The sender's email address for outgoing email messages. If the value is empty or set to **Default**, the sender address specified in the Switch preferences (*Mail send* category) will be used. If you want to use a different sender, enter the email address of your choice and do not forget to specify the custom SMTP authentication parameters.
Reply address	The e-mail address to which a receiver of the message should send a reply. If the value is empty or **Default**, the sender address specified in the Sender address field is used (i.e. to the address that was used to send mails). **Note:** The value of this property is used in the **Reply-To** SMTP header that is normally used by email client applications to send a reply. However, the **From** field of an email in the client application does not display this address, instead it shows the sender address specified in the Sender address field.
Message format	The format of the message that will be sent, either **Plain text** or **HTML**. **Note:** Make sure to choose the correct format for the selected body template (next field), e.g. if you upload an HTML template, you should select HTML.
Body template	The location of the template of the e-mail body: • If set to **Built-in**, a built-in template is used and you can enter the text of your choice in the *Body text* property.

Property	Description
	Include attached body text allows you to insert the body text attached to the job as part of its e-mail info, after the body text. *Display metadata* allows you to specify the *Metadata fields* that should appear in the e-mail. • If set to **Fixed file**, you can upload a *Template file* (HTML or text) that contains the template for the message body. Make sure to inform your customer in this message about the required reply syntax (see below). **Tip:** To make it easier for your customers, you could present the Checkpoint actions as buttons and add a Submit button that automatically generates the reply mail. • If set to **Associated with job**, the *Template dataset* (which is the name of the metadata dataset associated with the job containing a plain text or HTML template for the email body) will be used. For more information about attached email info, refer to *Using email info in Switch* on page 233.
Attach files	If set to **Yes**, the incoming job is attached to the e-mail message that is sent out. This is useful if the customer should review the job.
Enable report viewing	If set to **Yes**, the metadata dataset indicated with the subordinate property is attached to the e-mail message that is sent out.
Report dataset name	The name of the dataset to be attached to the e-mail message.
Report name suffix	The name of the attached report is formed by adding this suffix to the name of the job, before the file name extension.
Report name extension	The file name extension for the report. Select "Data Model" to automatically use XML, JDF or XMP depending on the data model of the exported data set. For the Opaque data model, the original backing file's extension is used.
Allow multiple outputs	If set to **Yes**, the user can send copies of a job along more than one outgoing connection; otherwise the job is sent along exactly one of the outgoing connections.
Server type	The type of server from which to retrieve email. Choices are **POP3** and **IMAP**.
Server address	The URL or IP address of the server from which Switch retrieves e-mail (to check the customer's reply).

Property	Description
	Tip: You can find the POP3 or IMAP settings of your mail provider (e.g. gmail) on the internet. Note that POP3/IMAP must be enabled on your mail account. For more information, refer to the documentation of your mail provider.
Port	Specify the port to be used for communication with the server (as specified in the POP3/IMAP settings of your mail provider)
Accounts	A list of accounts (names and corresponding passwords) from which to retrieve e-mail. This is usally your own account (as set in the Switch user preferences).
Use secure password verification	Defines whether to log in to the e-mail server using secure password verification.
Server requires secure connection	Defines whether the e-mail server requires a secure connection using the TLS protocol.
Check every (minutes)	The frequency of checking the e-mail accounts for new messages.
Fail jobs after timeout	If set to **Yes**, jobs are failed after residing in the Checkpoint for a certain period of time (specified in the subordinate properties). Failed jobs are moved to the outgoing connection specified in the subordinate properties or to the Problem jobs folder.
Unit	Selects the unit for the subsequent property: Minutes, Hours, Days.
Timeout delay	The timeout delay in the units indicated by the previous property (0 means 'no timeout').
Fail connection	The name of the connection to which failed jobs must be moved. If this property value is empty or if the specified name does not match any of the outgoing connection names, failed jobs are moved to the Problem jobs folder.

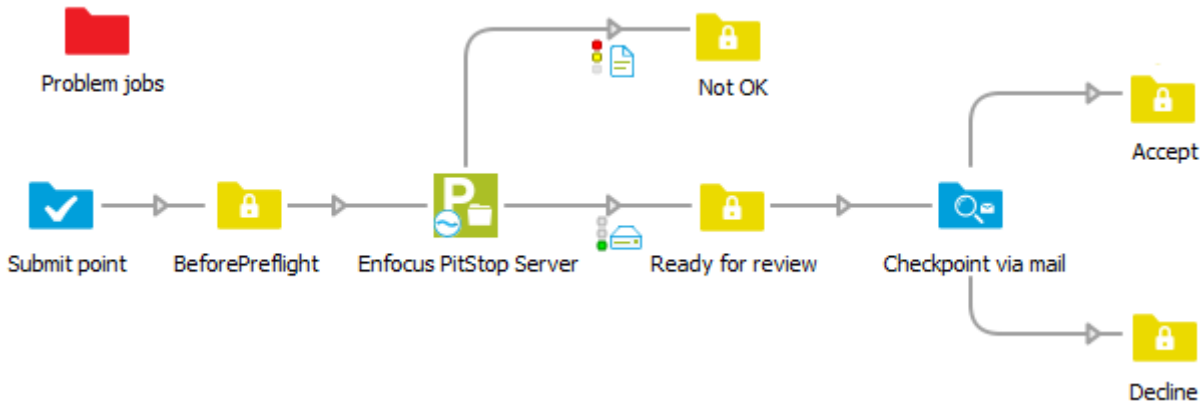
Reply syntax

The user's reply message must specify the job ID and the selected Checkpoint action(s) in a simple format. Specifically, Switch searches for the following character sequences:

- "Job identifier:" followed by the job ID (as specified in the original e-mail sent to the customer).
- "Action:" followed by one of the Checkpoint action names, or a list of comma-separated action names (in case multiple actions are allowed).

In both cases, the text is case insensitive. All other text in the message is ignored.

Example flow



In the above example, jobs are submitted via a Submit point. They are preflighted using Enfocus PitStop Server, and moved to two separate folders, depending on the outcome of the preflighting.

Files that are preflighted OK, are moved to the *Ready for review* folder element and will be presented to the customer for approval. This works as follows:

1. As soon as a job arrives in *Ready for review*, a message is sent to the customer (i.e. to the email address in the To addresses property of Checkpoint via mail) - see the example mail below.
2. The customer has the chance to review the job (optionally, the job files are attached to the email) and sends back a reply that contains the job ID and the Checkpoint action of his choice (*Accept* or *Decline*) in the specified format- see the example reply below.
3. As soon as Switch receives the reply, the job that was waiting in the *Ready for review* folder is moved to the corresponding folder.

Example Mail

Dear customer,

Job identifier: 000E2

Message text:
This is the body text.

Possible checkpoint actions (please choose one):
Declined
Accept

Email was triggered by this file :
ForReview.pdf

Attachments:
Job file: ForReview.pdf

--- Important information ---
Reply message should contain the following lines:
Job identifier: job identifier from the text above
Action: action from the list above or comma separated actions list

Example Reply

Job identifier: 000E2
Action: Accept

Pack job

Pack job is a processor that packs a job and its associated metadata for transmission. The result is always a single ZIP file that contains a globally unique identifier to identify it across multiple Switch instances.

Pack job also stamps the internal job ticket of its output with the unique identifier so that confirmations can be matched with the packed data without opening the ZIP file.

See *Acknowledged job hand-off* on page 240 for an example of how to use this tool.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Pack job** element will be shown in the list:

- ZIP
- compress
- archive
- Internet
- web

- network
- communication
- transfer
- acknowledged
- hand-off

Connections

Pack job allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Include internal metadata	If set to **Yes**, the output archive contains internal job ticket information for the job (including e-mail info, hierarchy info, private data fields, etc.).
Include external metadata	If set to **Yes**, the output archive contains a copy of the external metadata (that is, all datasets) associated with the job. Embedded metadata is always included since it is part of the job file itself.
Compress	If set to **Yes**, the data in the output archive is compressed (the default behavior). If set to **No**, the data is stored in the output archive without compression, dramatically reducing processing time; this can be meaningful when speed is more important than size, or when the data does not compress well (as is the case for JPEG images).
Password	The password used for protecting the output archive, or empty if no password protection should be used.

Unpack job

Unpack job is a processor that unpacks a job that was packed for transmission with Pack job.

Outgoing data success connections receive the unpacked job, with restored metadata (if it was included in the packed archive). Outgoing log success connections receive a checksum-protected XML file that can serve as a formal confirmation of successful receipt of the job, recognized by the Monitor confirmation element.

Incoming jobs that do not have the appropriate format (or that were corrupted during transmission) are sent to the data error connection or if there is no such connection, these jobs are moved to the problem jobs folder.

See *Acknowledged job hand-off* on page 240 for an example of how to use this tool.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Unpack job** element will be shown in the list:

- ZIP
- uncompress
- unzip
- archive
- Internet
- web
- network
- communication
- transfer
- acknowledged
- hand-off

Connections

Unpack job supports outgoing traffic-light connections of the following types:

- Data success: carries successfully unpacked jobs, with restored metadata.
- Log success (optional): carries confirmation file that should be returned to the sender of the packed job.
- Data error (optional): carries incoming jobs that cannot be unpacked; if there is no such connection, these jobs are moved to the problem jobs folder.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
Passwords	A list of passwords used for opening the packed data, if needed. The script expression can be used to determine a password dynamically, for example based on the sender of the packed data.
Restore metadata	If set to **Yes**, internal job ticket information and external metadata associated with the job are restored from the packed data (overwriting any metadata already associated with the packed data).

Property	Description
	Embedded metadata is always included since it is part of the job file itself.
Email info	Special options for email info in the internal metadata: • Restore and replace • Restore and merge • Don't restore
Hierarchy info	Special options for hierarchy info in the internal metadata: • Restore and replace • Restore and place at the top • Restore and place at the bottom • Don't restore
Fail duplicates	If set to **Yes**, a packed data entity that comes in twice (based on the unique identifier stored inside) is sent to the error output; otherwise it is treated as usual. In both cases the duplicate is logged to the execution log.
Keep info for (days)	The list of identifiers already processed is kept for at least this many days.

Monitor confirmation

Monitor confirmation is a processor that monitors incoming receipt confirmations (generated by Unpack job) and matches them against a copy of the packed data (generated by Pack job) waiting in its input folder. When no confirmation is received after a certain amount of time, the tool can be setup to retry the communication (that is, send another copy of the packed data).

See *Acknowledged job hand-off* on page 240 for an example of how to use this tool.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Monitor confirmation** element will be shown in the list:

- Internet
- web
- network
- communication
- transfer

- acknowledged
- hand-off

Connections

Monitor confirmation supports outgoing traffic-light connections of the following types to support its various actions:

Action	Connection type	Comments
Confirm	Success data	When a matching confirmation is received, the packed data is removed from the input folder and sent along this connection.
	Success log	When a matching confirmation is received, it is sent along this connection.
Retry	Warning data	For each retry attempt (as specified by the tool's properties) a copy of the packed data is moved along this connection; the original packed data stays in the input folder.
Reject	Error data	After all retries have timed-out, the packed data is removed from the input folder and sent along this connection.
	Error log	When a confirmation is received that does not match any of the waiting packed data files or that is corrupt, it is sent along this connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Retry count	The number of retry attempts made when no confirmation is received.

Property	Description
Retry delay	The delay (in minutes) between each retry attempt and the timeout after the last one.

5.1.2.5. Apps

This category is only available if you have installed at least one app. For more information about working with apps, refer to the dedicated chapter: *Working with apps in Switch* on page 299.

5.1.2.6. Configurators

In the **Flow elements** pane, click the **Documentation...** option in the contextual menu of a configurator to view the documentation related to it.

For more information about working with the configurators, refer to the chapter about the *Configurator Module* on page 358.

5.1.2.7. Metadata

XML pickup

XML pickup is a processor that allows associating an arbitrary XML file with a job as metadata. It supports the following pickup mechanisms:

- Metadata alongside asset
- Metadata in job folder asset
- Metadata refers to asset
- Metadata is asset

For more info see *Pickup modes* on page 431.

Keywords

Keywords can be used with the search function above the Flow elements pane.

The keywords for the **XML pickup** element are:

- metadata
- dataset
- asset

Data model

The metadata source must be a well-formed XML file with any schema. The dataset data model is XML.

Connections

XML pickup allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Dataset name	A name for the set of metadata picked up by this tool; see picking up metadata
Pickup mode	The pickup mechanism; one of: • Metadata alongside asset • Metadata in job folder asset • Metadata refers to asset • Metadata is asset

Additional properties are shown depending on the selected pickup mode; see *Pickup modes* on page 431 for the description of each Pickup mode.

JDF pickup

JDF pickup is a processor that allows associating an JDF file (that is, a JDF job ticket) with a job as metadata. It supports the following pickup mechanisms:

- Metadata alongside asset
- Metadata in job folder asset
- Metadata refers to asset
- Metadata is asset

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **JDF pickup** element are:

- metadata
- dataset
- asset
- ticket
- adticket

Data model

The metadata source must be a JDF file conforming to the JDF 1.3 specification. The dataset data model is JDF.

Connections

JDF pickup allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Dataset name	A name for the set of metadata picked up by this tool; see picking up metadata
Pickup mode	The pickup mechanism; one of: • Metadata alongside asset • Metadata in job folder asset • Metadata refers to asset • Metadata is asset

Additional properties are shown depending on the selected pickup mode; see *Pickup modes* on page 431 for more information.

Adobe Acrobat JDF

The JDF pickup tool supports JDF files generated by Adobe Acrobat 7 or higher. If the JDF file produced by Acrobat is delivered as a separate file it can be picked up with the "alongside asset" or "in job folder asset" mechanisms. If the JDF file and the corresponding assets are delivered as a single combined MIME file, the uncompress tool should be used in front of the JDF pickup tool to extract the individual files into a job folder.

XMP pickup

XMP pickup is a processor that allows associating an XMP packet with a job as metadata. It supports the following pickup mechanisms:

- Metadata embedded in asset (the default location for an XMP packet)
- Metadata alongside asset
- Metadata in job folder asset
- Metadata is asset

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **XMP pickup** element are:

- metadata
- dataset
- asset
- ticket
- adticket

Data model

The metadata source must be an Adobe XMP packet or a standalone XMP file conforming to the Adobe XMP specification dated June 2005. The dataset data model is XMP.

Connections

XMP pickup allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Dataset name	A name for the set of metadata picked up by this tool; see picking up metadata
Pickup mode	The pickup mechanism; one of: • Metadata embedded in asset • Metadata alongside asset • Metadata in job folder asset • Metadata is asset

Additional properties are shown depending on the selected pickup mode; see *Pickup modes* on page 431 for more information.

Locating XMP packets

The mechanism for embedding XMP packets in a file is also described in detail in the Adobe XMP specification mentioned above.

There are two distinct methods to locate XMP packets embedded in a file:

- Scan the complete file for the magic markers at the head and tail of a packet: this works for any file format, but may possibly locate the wrong packet in case a composite document contains multiple packets.

- Interpret the file format's structure to track down the packet: this guarantees that the correct packet has been located and it is usually much faster, but it requires a specific algorithm for each distinct file format.

The XMP pickup tool interprets the file format for a number of supported file formats, and scans the complete file for all other file formats.

Synchronizing with EXIF and IPTC

For certain supported file formats the values of binary EXIF and IPTC tags can be merged with the embedded XMP packet before it is picked up. See the "Synchronize EXIF/IPTC fields" property for the embedded pickup mechanism.

XMP Inject

The XMP Inject Flow Element can be used for two main purposes:

- Inject an external dataset into the job

  The data to be injected is linked to the incoming job as an external dataset and corresponds to the XMP schema which is listed in the Switch jobticket.

  For example, the dataset could have been created by the export metadata mechanism which extracts information from a PDF.

  A scenario where we can use this feature is when merging information from multiple PDF's into a single PDF.
- Insert or update data to an existing XMP dataset

  All kinds of Switch variables can be injected as data. For example, we can use this feature in a GWG Add-Ticket to update the missing values.

Supported job types

- PDF
- Illustrator
- InDesign
- Photoshop
- TIFF
- JPEG
- PNG

Outgoing connections

The XMP Inject Flow Element requires at least one incoming connection. The outgoing connection is a traffic light connection of the following type only:

- Data error: to carry the incoming job when the action fails.
- Data success: to carry the incoming job after the action is successfully performed.

Note: The incoming files which have an external dataset will retain it even after passing through the XMP Inject tool if the user has not specified in the settings, to discard external dataset. There are no outgoing log connections.

Script declaration

Language	C++
Incoming connections	Yes; required
Outgoing connections	Error vs success
Execution mode	Serialized
Position	Metadata category
Keywords	Metadata, xml, insert, update

Properties

Property name	Description
Action	Select an action to perform on the incoming job. "Update XMP" and "Inject XMP" options are available in this drop-down menu.
Dataset	Select a dataset that contains the information. Make sure the dataset is in XMP format. This property is visible only when you select "Inject XMP" for **Action**.
Keep dataset	Set to "Yes" to keep the external dataset after it has been injected. Select "No" to discard the external dataset. This property is visible only when you select "Inject XMP" for **Action**.

XMP fields	This option allows you to select an XMP field and update its value in the **Update XMP data** dialog box and is visible only when you select "Update XMP" for **Action**.
	Rule properties:
	• **Name**: Enter the name of the rule.
	• **Description**: A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.
	• **XMP location path**: Select or define the XMP location path.
	• **New value**: The new value is interpreted according to the value type selected in **Value type** drop-down menu. For example, if the value type is "Date" then the new value must be a string representing datetime in ISO 8601 as described here: *http://www.w3.org/TR/NOTE-datetime*
	• **Value type**: Select the value type from the options: String, Number, Boolean, Date and Localized text
	  • If you select "Number" you have to specify the "Precision" in the textbox of the same name.
	  • If you select "Localized text", two more textboxes, "Generic language" and "Specific language" appear:
	  • *Generic Language*: Enter the name of the generic language. Example: 'en'. Or choose **Select from library** option to view a list of languages to select from. This language is used if

Property name	Description
	the specific language does not match. Make sure the format complies with the RFC 3066 standard or leave this field empty. • *Specific Language*: Enter the name of the specific language. Example: 'en-UK' or 'en-US'. Or choose **Select from library** option to view a list of languages to select from. This language will be selected when there is an exact match. Make sure the format complies with the RFC 3066 standard or use 'x-default' as artificial language to denote a default item in an alt-text array. This field cannot be empty.

Note: Before appending information to a job, user should ascertain that the job has an external XMP dataset which conforms to the RDF schema, as it is not possible to inject any arbitrary XML file. If the dataset conforms and matches the file type, it is injected into the job and the job is routed through the Success out connection. The job is routed to the error out connection if the dataset cannot be injected or if the specified dataset cannot be found.

When updating values to an existing XMP dataset, select the node and add it to a list of values that must be updated.

Injecting XMP from XML Data

XMP and JDF are both XML based languages. However, both these, as well as XML need to be converted to the proper XML format for XMP injection, from other sources or from within other Switch elements.

Within Switch, this can be done with the XSLT tool and custom style sheets to convert XML into the XMP format before injection.

Opaque pickup

Opaque pickup is a processor that allows associating an arbitrary file with a job as metadata. It supports the following pickup mechanisms:

- Metadata alongside asset
- Metadata in job folder asset

Keywords

Keywords can be used with the search function above the elements pane.

The keywords for the **Opaque pickup** element are:

- metadata
- dataset
- asset

Data model

The metadata source can be any file (but not a folder). The dataset data model is Opaque.

Connections

Opaque pickup allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Dataset name	A name for the set of metadata picked up by this tool; see picking up metadata
Pickup mode	The pickup mechanism; one of: • Metadata alongside asset • Metadata in job folder asset

Additional properties are shown depending on the selected pickup mechanism; see the description of each mechanism for more information.

Export metadata

Export metadata is a processor that allows saving a metadata dataset associated with the incoming job to a standalone file. The tool merely copies the dataset's backing file to the output location without any transformations. The *XSLT transform* on page 152 tool can be used to transform the exported metadata if needed.

The outgoing log connections carry the exported metadata; the outgoing data connections carry the incoming job without change. If the incoming job has no dataset with the specified name, no log output is generated.

Keywords

Keywords can be used with the search function above the Elements pane.

The keywords for the **Export metadata** element are:

- XML
- JDF
- XMP
- opaque
- metadata

- dataset

Connections

Export metadata supports any number of outgoing traffic-light connections.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Dataset name	The name of the set of metadata (associated with the job) to be exported; see *Picking up metadata* on page 429 for more information
Filename body	The filename for the generated metadata file (without filename extension)
Filename extension	The filename extension for the generated metadata file; select "Data Model" to automatically use "xml", "jdf" or "xmp" depending on the data model of the exported dataset (for the Opaque data model, the original backing file's filename extension is used)
Remove dataset	If set to Yes, the job's dataset will be removed after the export.

5.1.2.8. Database

Database connect

This tool helps in configuring certain settings in the databases (like selecting Datasource, adding SQL statement etc) without the use of scripting. It is only available if you have licensed the *Database module*.

Drag and drop the **Database Connect** to the workspace.

Keywords

If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Database Connect** element will be shown in the list:

- SQL
- database
- metadata

- xml
- export
- select
- insert
- update
- delete

Connections
Database Connect needs at least one incoming connection.

Property

Property	Description
Name	Provide a name for the flow element. This name is displayed in the workspace.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Select data source	Select a data source from the list of predefined data sources. **Note:** If the list is empty, you should first set up a data source. Refer to the **ODBC data sources** option in the **User preferences** dialog (See *Setting up an ODBC database connection* on page 52).
SQL statement	Specify SQL statements using any one of the following three options: • Edit multi-line text • Define multi-line text with variables • Define script expression **Note:** Please pay special attention when using other variables and make sure that the result of the multi-line text is a valid SQL statement.
Log name	Specify the name of the log where the result of the statement should be written by using one of the following three options: • Inline value • Define single-line text with variables • Define script expression

Property	Description
Binary data in opaque dataset	If the result of the SELECT statement returns binary data (for example: video form), select **Yes**. Otherwise, select **No** and configure the subordinate properties.
Log type	*Only available if Binary data in opaque dataset is set to No.* Format of the log (where the result of the statement will be written). Options: • **CSV** • **XML**
Encode binary data	*Only available if Binary data in opaque dataset is set to No.* Defines the way binary data is converted. • **Encode with Base64**: default • **Keep as is**: Use this option if the ODBC driver returns binary table fields. This is for example the case when you're using FileMaker in combination with Switch. **Note:** Be careful with this option; it may lead to a corrupted logfile.

At present there is no SQL editor available. Therefore, copying statements generated by the variables, multi line text with variables, database group and build SQL statement dialog box may result in errors.

Note: Refer this site for an *SQL Tutorial*.

5.1.2.9. Legacy

Compress

Compress is a processor that places the incoming file or a job folder into a compressed ZIP archive. All files in a job folder are placed in a single archive. The archive is named as the incoming file or job folder with a ".zip" extension.

Note: This tool is outdated and should only be used for maintenance reasons. Please use the new *Archive* on page 129 tool, which provides proper support for Unicode based on zip file format specification.

Keywords

Keywords can be used with the search function above the Flow elements pane.

The keywords for the **Compress** element are:

- ZIP
- archive

Connections

Compress allows only a single outgoing connection.

Properties

Property	Description
Name	The name of the flow element displayed in the canvas
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element
Compress	If set to yes, the files in the ZIP archive are compressed (the default behavior) If set to no, the files are stored in the ZIP archive without compression, dramatically reducing processing time; this can be meaningful when speed is more important than size, or when the files will not compress well anyway (example: JPEG images) – but you still want a single archive containing all files
Use password	If set to yes, all created archives are password-protected
Password	The password used for protecting archives

Note: Switch uses zlib which does not support the AES encryption, therefore Switch cannot read passwords which use the AES encryption. Hence, the Uncompress tool cannot read passwords which have been encrypted using the AES encryption. As a workaround, users can try using a third-party archiver as a command line application from Switch.

Uncompress

Uncompress is a processor that extracts files from an archive in one of the following formats:

- ZIP
- RAR
- MIME

Any files that are not recognized as an archive are passed through the Uncompress tool without change.

Note: This tool is outdated and should only be used for maintenance reasons. Please use the new *Unarchive* on page 130 tool, which provides proper support for Unicode based on the zip file format specification.

Keywords

Keywords can be used with the search function above the elements pane.

The keywords for the **Uncompress** element are:

- ZIP
- RAR
- MIME
- archive
- compress
- decompress
- unzip

Filenames and folder structure

The following table describes the resulting file or folder structure and the corresponding naming conventions.

Multiple files from the same archive are always placed in a job folder. If the intention is to inject these files into the flow as separate jobs, a job dismantler should be placed directly after the uncompress flow element.

Archive contents	Uncompress result
Single file	The file (named as specified in the archive).
Multiple files or folders with a common root folder	A job folder (named as the nearest common root folder) containing all files and folders (named as specified in the archive).
Multiple files or folders without a common root folder	A job folder (named as the archive after stripping the extension) containing all files and folders (named as specified in the archive).

Connections

Uncompress allows only a single outgoing connection

Properties

Property	Description
Name	The name of the flow element displayed in the canvas.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element.

Passwords	A list of passwords for opening password-protected archives; each of the passwords in the list will be tried in turn.
	The script expression can be used to determine a password dynamically, for example based on the sender of the packed data.
	Note: The result of the script expression evaluation must be a string containing one password or a list of passwords separated by a newline character ('\n').
	Example:
	`var thePasswords = new Array();`
	`thePasswords.push( "password" );`
	`thePasswords.push( "password2" );`
	`thePasswords.join( '\n' );`

Remove redundant folders	If set to **Yes**, for archives where the files or job folders are contained in deeply nested subfolder structures, removes all but the deepest subfolder level while uncompressing **Example:** A PDF file that is compressed as "Folder 1\Folder 2\Folder 3\Test.pdf" is uncompressed as "\Folder3\Test.pdf", if this option is enabled.

Note: The Uncompress tool cannot read passwords which have been encrypted using the AES encryption. Switch uses zlib which does not support the AES encryption. As a workaround, users can try using a third-party archiver as a command line application from Switch.

5.1.2.10. Flow elements matrix

The following table provides an overview of the flow elements offered by each module.

Flow element	Switch Core engine	Config module	Meta data module	Data base module	Scripting module	Switch Client module
Basics						
Connection	✔					

Flow element	Switch Core engine	Config module	Meta data module	Data base module	Scripting module	Switch Client module
Folder	✔					
Problem jobs	✔					
Submit hierarchy	✔					
Archive hierarchy	✔					
Set hierarchy path	✔					
Job dismantler	✔					
Ungroup job	✔					
Split multi-job	✔					
Assemble job	✔					
Generic application		✔				
Execute command		✔				
Tools						
Sort by preflight state	✔					
Archive	✔					

Flow element	Switch Core engine	Config module	Meta data module	Data base module	Scripting module	Switch Client module
Unarchive	✔					
Split PDF	✔					
Merge PDF	✔					
Hold job	✔					
Inject job	✔					
Rename job	✔					
File type	✔					
Sort job	✔					
Log job info	✔					
Sort files in job	✔					
XSLT transform	✔					
Recycle bin	✔					
Scripting						
Script element					✔	

Flow element	Switch Core engine	Config module	Meta data module	Data base module	Scripting module	Switch Client module
Communication						
HTTP request	✔					
Webhook	✔					
FTP receive	✔					
FTP send	✔					
Mail receive	✔					
Mail send	✔					
Submit point						✔
Checkpoint						✔
Checkpoint via mail						✔
Pack job	✔					
Unpack job	✔					
Monitor confirmation	✔					
Apps						

Flow element	Switch Core engine	Config module	Meta data module	Data base module	Scripting module	Switch Client module
Various apps purchased through the Enfocus Appstore See also *Working with apps in Switch* on page 299.	✔					
Configurators						
Various configurators See *Configurator overview* on page 361		✔				
Metadata						
XML pickup			✔			
JDF pickup			✔			
XMP pickup			✔			
XMP inject			✔			
Opaque pickup			✔			
Export metadata			✔			
Database						
Database connect				✔		
Legacy						
Compress	✔					

Flow element	Switch Core engine	Config module	Meta data module	Data base module	Scripting module	Switch Client module
Uncompress	✔					

5.2. Working with flows

Working with Switch means creating, designing and running flows for the processes you want to automate.

5.2.1. About working with flows in Switch

Working with flows consists of the following steps:

1. First you have to **create a new flow**. You can start from scratch (blank flow) or from a sample flow.
2. Next, you have to **design your flow**, by dragging the required flow elements to the canvas. You must configure the properties of the different flow elements and connectors.
3. Finally, you must **activate** the flow, and test it, using test files, until you are happy with the result.

For a step by step explanation, refer to the Switch Quick Start Guide on the *Enfocus website*.

For a detailed description of everything you can do with Switch flows, refer to the topics below.

5.2.2. Creating a new blank flow

Use this procedure, if you want to create a blank flow with an empty canvas. You'll have to add all flow elements yourself.

To create a blank flow

1. Do one of the following:
   - In the toolbar at the top of the screen, click

   - From the menu, select **Flow** > **New Flow...**.
   - In the Flows pane, right-click and select **New Flow**.

   A new flow is created. By default it is called "New flow" (followed by a number if it's not your first "New flow").

2. Enter a meaningful new name for your flow.

   Your cursor will automatically focus on the flow name in the Flows pane, so you can immediately type a new name. If you click outside the name field, the name will be displayed in italics and it will have an asterisk next to it, to indicate that the flow hasn't been saved yet.

You can now add flow elements as required.

5.2.3. Creating a new flow based on a sample flow

Use this procedure, if you want to start from one of the Switch sample flows. These flows come with the default Switch installation and are available through the Flows menu.

To create a flow starting from a sample flow

1. From the menu, select **Flow** > **Import sample flows...**.
2. Select the flow(s) you want to start from.
   - To select all flows in one go, click **Select all**.
   - To clear the checkboxes of all already selected flows, click **Clear selection**.
   - To select one or more flows, select the corresponding checkbox(es).

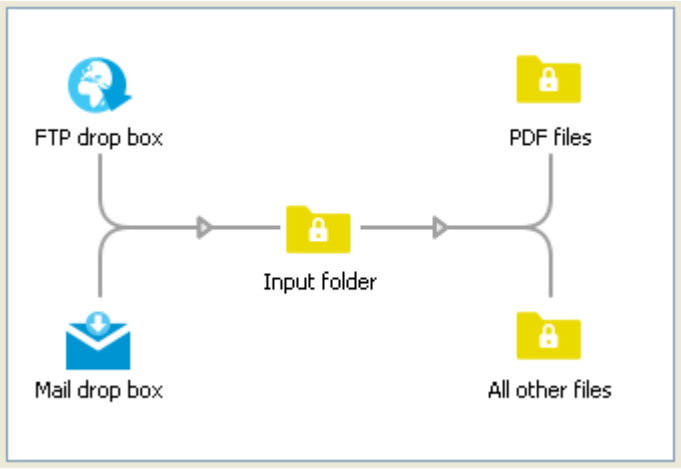
   Note:
   - For a description of the available flows, click a flow name. The description appears in the lower part of the dialog.
   - You can select more than one flow, for example to have a look at the differences or to see if they are similar to what you need. All the flows you select will become available in the Flows pane.
3. To import the selected flow(s), click **OK**.
   The Flows pane shows the imported sample flow(s). You can modify and expand the flow(s) as required. See *Designing flows* on page 214.

5.2.4. Designing flows

5.2.4.1. Working with the canvas

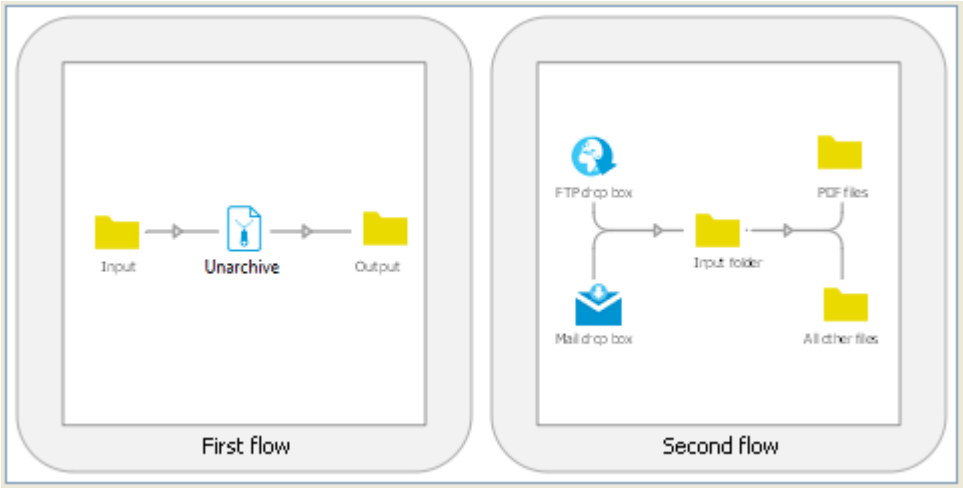
The canvas is the central workspace area that allows viewing and editing flows. The canvas always displays the flows selected in the Flows pane.

Single flow at full size



When a single flow is selected, the canvas displays it at full size and scroll bars appear if the flow design is larger than the visible area. In this mode the flow is editable (assuming that it is inactive and unlocked); see *Editing a flow* on page 216.

Multiple flows as tiles



When two or more flows are selected, the canvas displays a tile for each flow. A tile is a scaled-down version of the flow design similar to a thumbnail. Tiles can't be edited. However you can select a particular tile and edit its flow properties in the Properties pane.

In tile mode the canvas never shows horizontal scroll bars. Instead the size of the tiles is adjusted so that a predefined number of tiles fit on a row. The maximum number of tiles shown can be set as well.

- To adjust the number of tiles in a row, choose the "Tiles in a row" menu item in the canvas context menu and select one of the choices 1 through 9 in its submenu (this context menu item is present only while the canvas displays tiles).
- To return one of the displayed flows to full size:
  - Double-click the tile in the canvas; or

  - Select the tile in the canvas and choose the "Show at full size" menu item in the canvas context menu; or
  - Select the flow in the Flows pane (without selecting any other flows).
- To change the maximum tiles shown, select the "Maximum tiles" menu item in the context menu and select the desired value. If more flows are selected than this maximum number, the canvas will show a message instead of the tiles.

Single flow scaled to fit

- To display a large flow design (that doesn't fit the current Canvas pane) as a tile that fits the visible area of the canvas:
  - Select the flow and choose the "Scale to fit" menu item in the canvas context menu (this context menu item is present only if the canvas shows a scroll bar).
- To return the scaled-down flow to full size, perform one of these steps:
  - Double click the tile in the canvas; or
  - Select the tile in the canvas and choose the "Show at full size" menu item in the canvas context menu.
- You can also zoom in and zoom out the canvas area to enlarge or minimize the selected flow:
  - On Windows OS, press the **Ctrl** button and scroll with your mouse.
  - On Mac OS, press the **Command** button and scroll with your mouse.

Editing a flow

Before making changes to a flow:

- Ensure that the flow is inactive and unlocked; an active or locked flow is displayed with a darkened background and cannot be edited.

  Note: Are you viewing the flow with a Remote Designer? In that case, a darkened background may indicate that you don't have the right to edit the flow (read-only access). Refer to the section about user configuration for Remote Designer, for example: *Configuring a user* on page 60 (last step).

- Select the flow in the Flows pane without selecting any other flows; when multiple flows are selected the canvas shows tiles which cannot be edited.

5.2.4.2. Working with flow elements

A flow design (as displayed in the canvas) consists of a number of interconnected flow elements. Switch offers a range of flow elements, including:

- Connection: a special flow element used to connect other flow elements; connections determine how jobs can travel along a flow.
- Folder: a central flow element used to (temporarily) store or modify jobs in between processes.
- Various flow elements types to produce, process and consume jobs.

Adding new flow elements

To add a new flow element to the canvas

Do one of the following:

- Drag the icon for the desired flow element type from the **Flow elements** pane onto the canvas in the desired location.
- Right-click a blank area of the canvas and select **Add** > **<category>** > **<desired flow element>**.

For flow elements that are used often, you can use the following shortcuts:

- To *add a Folder flow element*, you only need to *double-click* in the canvas where you want the Folder to be added.

- To *add a favorite flow element*, you can use the following keyboard shortcuts: *ctrl +<number>* (Windows) or *cmd+<number>* (Mac). The number (1-9) refers to the position of the flow element in the Favorites category (first in the list = 1, second = 2, etc). The flow element is placed in the middle of the canvas.

Connecting flow elements

To connect two flow elements that are already present on the canvas

Do one of the following:

- Drag the Connection icon from the Flow elements pane and drop it onto the first flow element; then click the second flow element.
- Double-click the first flow element; then click the second flow element.
- Right-click the first flow element and select **Start connection**; then click the second flow element.

A connection line connects the two flow elements.

Inserting a folder between two non-folder flow elements

In Switch, you cannot make a connection between two non-folder flow elements, without having a folder in between.

For this reason and to save time, when dragging a connection between two non-folder flow elements, Switch automatically adds a folder in between and creates a double connection (from the first flow element to the folder, and from the folder to the second flow element).

You can see that a folder is added upon creating the connection as the drag line includes the outline of a folder between source and destination, and the cursor changes to "allowed".

This insertion of a folder does not take place if,

- There is not enough room in between the two flow elements to insert a folder.

- Inserting a folder does not result in valid connections.

Inserting a flow element on an existing connection

You can insert a flow element on an existing connection by dragging and dropping the new flow element on the connection between two other elements.

The flow element that you insert can be dragged from the Flow elements pane, or you can drag and drop an existing flow element from the canvas, if it does not have any connections yet.

The connection from the original "source" flow element will go to the newly inserted flow element and a new connection from the newly inserted element to the "original" target element will be established.

If necessary, a folder will be added in between, just as when connecting two flow elements. See *Inserting a folder between two non-folder flow elements* on page 217.

You can see that the flow element will be added on the existing connection as the outline of the element is shown between source and destination.

This insertion on a connection will not take place if:

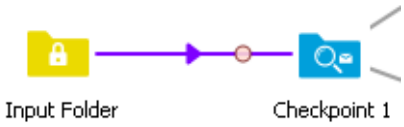
- There is not enough room in between the two flow elements to insert the flow element (and a folder if necessary).
- Inserting the element doesn't result in a valid connection.

Manually changing connections

You can manually change connections by clicking and dragging the start or end of a connection from one flow element onto another one.

To manually change connections

1. Select the connection you want to change.
2. Hover the cursor over the source or target end of the connection you want to change. A grab handle (red circle) appears, similar to the grab handle for the corner point, as shown below:



3. Click and drag the connection on another flow element, for which the new configuration is allowed:
   - For the target of the connection, this is similar to creating a new connection.
   - For the source, the new source flow element must accept outgoing connection of the same type and with the same injected properties.

   Note: To *copy* the connection instead of moving it, press the **Ctrl** key (for Windows) or **Alt** key (for Mac OS).

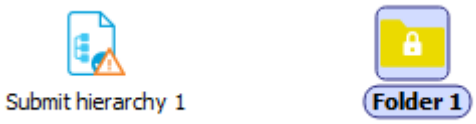
Warnings when adding new flow elements

After adding a new flow element to the canvas, the flow element may display an alert icon ( ) indicating a problem with the flow design.

This usually refers to missing connections, since many flow elements require at least one incoming and/or outgoing connection. For more information, hover your cursor over the icon to display a tooltip.

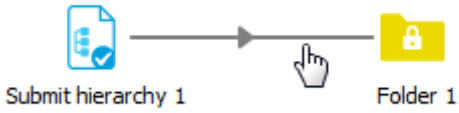
Example:

After adding a "Submit hierarchy" and a "Folder" the flow design looks as follows:



The tooltip for the Submit hierarchy 1 element states: The flow element requires at least one outgoing connection.

After adding a Connection element, the warning will be gone.



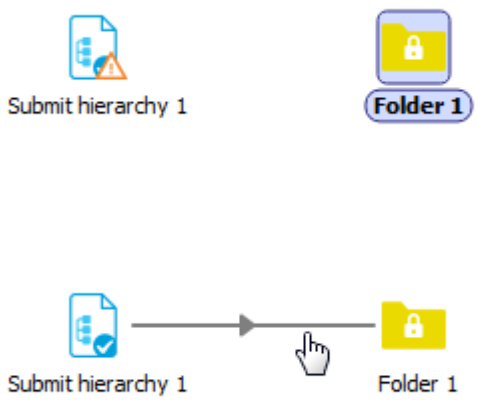
Selecting flow elements

Note: You can select multiple flow elements as required. However, a connection and other flow elements cannot be combined in one selection.

To select flow elements

1. To select one flow element at a time, click the flow element in the canvas.
   In the canvas, you can see which element is selected:
   - Selected flow elements are surrounded by a gray rectangle.
   - Selected connections have a darker color.
2. To select multiple flow elements at the same time, do one of the following:
   - Drag a selection rectangle around the flow elements in the canvas.
   - Click a first flow element, and then expand the selection by clicking other flow elements, while holding down the **Ctrl** key (on Windows) or **Command** key (on Mac OS).

Example of a selected flow element and a selected connection.

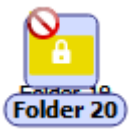


Moving flow elements

To move flow elements on the canvas

1. Select one or more flow element as required.
   See *Selecting flow elements* on page 219.
2. Use the arrow keys or drag and drop the selected flow element to the preferred place on the canvas.

   Note: If you're about to place two elements on top of each other, a warning icon appears. Move the element a little bit, to avoid that one of the two gets hidden.



Configuring flow elements

Each flow element (including the Connection flow element) offers one or more properties that help determine the flow element's behavior. You should set an appropriate value for each property (or use the default value) to fully configure a flow.

For a detailed description of the properties offered by each flow element, refer to *Flow elements: overview* on page 92.

Editing the name of a flow element

All flow elements (including the Connection flow element) offer at least one property: the name of the flow element as displayed in the canvas. When you add a new flow element, Switch provides it with a default name inspired by the flow element type. By default, a connection does not contain a name.

You can edit the Name property in the Properties pane, just like other properties (See *Changing flow element properties* on page 221), or you can edit the name directly on the canvas, as explained below.

Tip: For a better overview, we recommend using meaningful names!

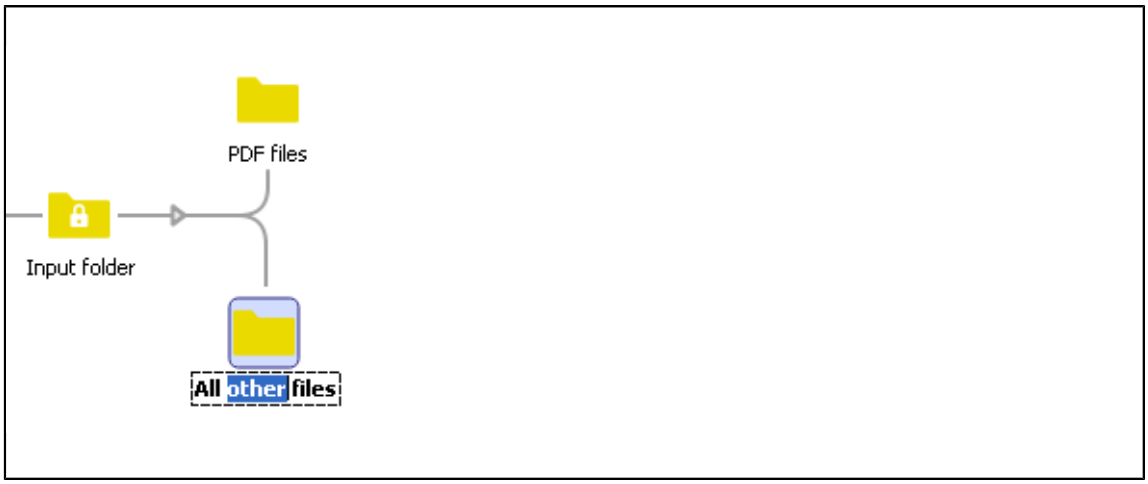
To edit the name of a flow element directly on the canvas

1. On the canvas, select the flow element.

   Ensure only one flow element is selected.

2. Click the *name* of the flow element (on the canvas).

3. Enter the new name or adjust the existing name.



Changing flow element properties

Switch provides you with default values for the flow elements, but you can change the defaults as required.

Note: You can only change the properties if the flow is not active and not locked.

To change the properties of flow elements

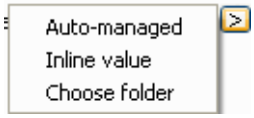
1. Select the flow element of which you want to change the properties.

   Note: If you select multiple (similar) flow elements at the same time, you can change the common properties.

   The properties of the selected flow element(s) are displayed in the Properties pane.

2. Click the property you want to change.
   Depending on the selected property, a text box, a button, or a drop-down menu appears.

3. Make the required changes:

If ... appears	Do the following:
A text box	Type the text in the displayed text field.
A drop-down menu	Select the appropriate option.
...	1. In the the property editor dialog that pops up, update the field(s) as required. 2. Click **OK**.
>	1. From the pop-up list, select one of the options.  Depending on the selected option, an inline editor or a dialog appears. 2. Configure the desired values.

For an overview of the properties and their meaning, see *Flow elements: overview* on page 92.

Your changes are applied immediately.

Resetting flow element properties

You can reset the property values to the factory defaults, as when creating a new flow element on the canvas.

To reset property values

1. Select the flow element.
2. Right-click the flow element, and select **Reset property values**.

Copying flow element properties

For all flow elements, including connections, you can copy and paste the property values.

Note: Property values can only be pasted to flow element(s) of the same (or a similar) type.

To copy flow element properties

1. Right-click the flow element, from which you want to copy the property values.

2. From the contextual menu, choose **Copy property values**.
3. Select the flow element(s) you want to paste the property values on.
4. Right-click the flow element(s), and select **Paste property values**.

Warnings when editing flow element properties

If property values are invalid or missing, you are informed in two ways:

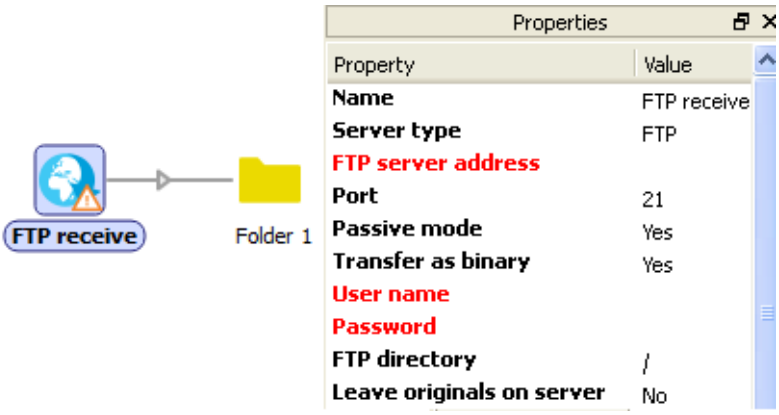
- The flow element is displayed with an alert icon (⚠).

  For more information, hover your cursor over the icon to display a tooltip.

- The invalid property is displayed in red in the Properties pane.

Example:

After adding and connecting an FTP receive flow element, the canvas and the Properties pane look as follows:



The tooltip for the FTP receive element states: Required fields are not valid: FTP server address, User name, Password.

After entering the missing information, the warning will be gone and the properties will be displayed in black again.

Adjusting the layout of the flow design

To adjust the layout of the flows design, select one or more flow elements (other than connection) and drag the selection around, or use the arrow keys to "nudge" the selection to the indicated direction in small steps. Connections automatically adjust to the new layout.

Aligning flow elements horizontally

To align flow elements horizontally

1. Select the flow elements to be aligned.
2. Do one of the following:

- *On Windows OS:*

  Select **Edit** > **Align Horizontally**, or press **Ctrl** + **Shift** + **H**.
- *On Mac OS:*

  Select **Enfocus Switch** > **Align Horizontally**, or press **Command** + **Shift** + **H**.

Aligning flow elements vertically

To align flow elements vertically

1. Select the flow elements to be aligned.
2. Do one of the following:
   - *On Windows OS:*

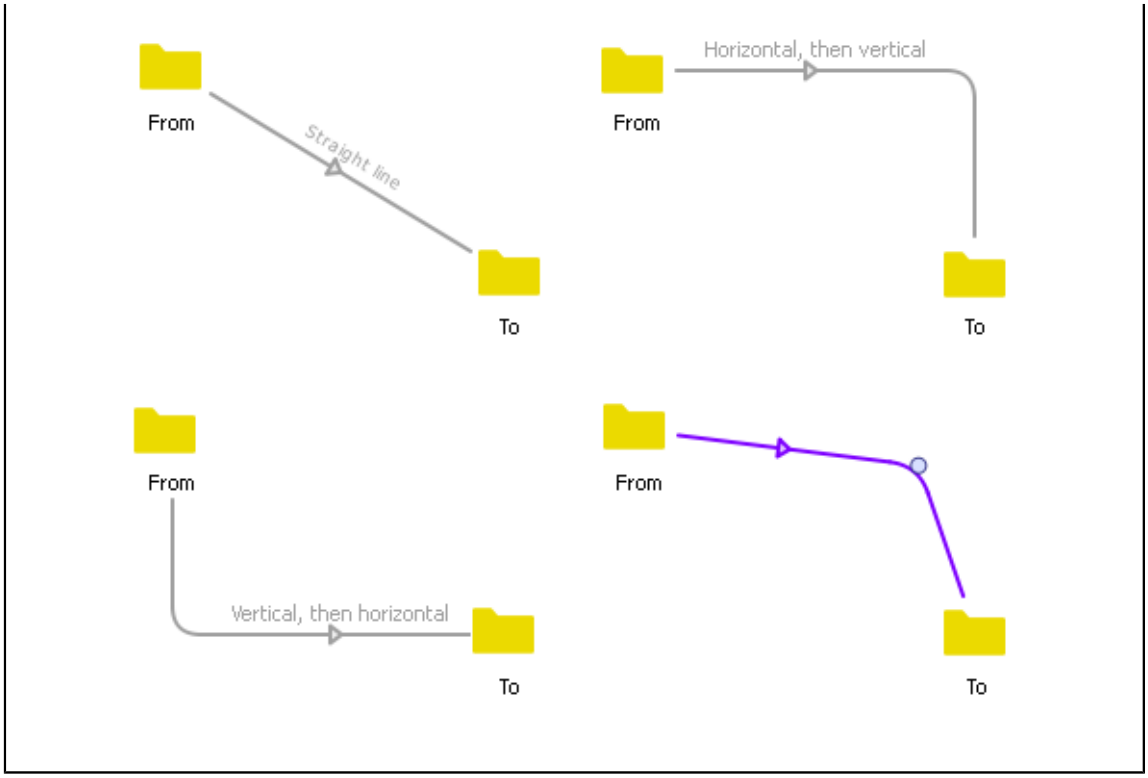
     Select **Edit** > **Align Vertically**, or press **Ctrl** + **Shift** + **V**.
   - *On Mac OS:*

     Select **Enfocus Switch** > **Align Vertically**, or press **Command** + **Shift** + **V**.

Adjusting the layout of a connection

By default, connections are drawn as straight lines between two flow elements. You can however adjust these lines to make a well-arranged design.

1. To draw the connection along the sides of a rectangle (with a rounded corner)
   a. Select the connection.
   b. Do one of the following:
      - Right-click the connection and select **Vertical, then horizontal** or **Horizontal, then vertical**.
      - In the Properties pane, set the connection's **Corner angle** to -90 or +90.
2. To draw the connection along a route somewhere in between these extremes
   a. Select the connection.
   b. Do one of the following:
      - Move your cursor over the connections's corner until a drag handle (blue circle) appears, and drag the handle to the desired direction.
      - In the Properties pane, set the connection's **Corner angle** to a value between -90 or +90.



Adjusting the colors of folders and connections

To make it easy to distinguish between different folder or connection types, for example between network and input folders, you can change the default color for folders (yellow) and connections (gray).

To adjust the colors of folders and connections

1. Select one or more connections or folders.

   Note: You cannot combine connections and folders in one selection.

2. Right-click to open the context menu.
3. Click **Choose color** and select the appropriate color from the list of predefined colors.

   You can choose one of the following colors:

   - Gray (default), Yellow, Green, Cyan, Blue, Magenta for *connections*.
   - Yellow (default), Orange, Green, Cyan, Blue, Magenta for *folders*.
   - Or click "Custom" and select the color of your choice using the color picker.

   Alternatively, you can set the color via the Properties pane.

Keep in mind that "conditional" colors (e.g. orange for connections on hold) will take priority over custom colors.

For example, even if you have chosen green for a particular connection, its color will change to orange when the connection is set on hold. When the connection is released, the chosen color (green) will be restored.

Copying and deleting flow elements

You can copy and paste flow elements within the same flow or to another flow. The copy includes all selected flow elements plus any connections between them. Connections to flow elements outside of the selection are not included. It is not possible to copy a connection on its own.

When pasting flow elements into a flow, Switch renames the new flow elements if needed to avoid name clashes between backing folders.

- To copy one or more flow elements to the pasteboard, select the flow elements and
  - Choose the **Edit** > **Copy** menu item, or
  - Choose the **Copy** menu item in the canvas context menu.
- To paste previously copied flow elements from the pasteboard into a flow, select the target flow and
  - Choose the **Edit** > **Paste** menu item, or
  - Choose the **Paste** menu item in the canvas context menu.
- To delete one or more flow elements from a flow, select the flow elements and
  - Choose the **Edit** > **Delete** menu item, or
  - Choose the **Delete** menu item in the canvas context menu, or
  - Press the **Delete** key.

Undoing flow editing operations

Switch remembers flow editing operations (including changes to flow element properties) since it was last started, and allows undoing these operations in reverse order.

There is a separate undo stack for each flow.

- To undo the most recent edit operation for a flow, select the flow and perform this step:
  - Choose the **Edit** > **Undo** menu item.
- To redo the most recently undone edit operation for a flow, select the flow and perform this step:
  - Choose the **Edit** > **Redo** menu item.

5.2.4.3. Advanced topics for designing flows

Working with folders

Working with individual files in Switch is quite straightforward. When files are grouped into folders (and sometimes in nested folder structures), you need to take the following information into consideration.

Switch distinguishes between two important concepts related to (and implemented by) folders:

- Subfolder hierarchies provide structure to file submissions and to final processing results by placing files in appropriately named subfolders (for example, a subfolder for each customer).
- Job folders represent file sets that move along the flow as a single entity, for example a page layout with its accompanying images and fonts, or the individual pages in a book.

Since both concepts are implemented with regular file system folders, Switch needs a way to know what it is looking at when it sees a folder. This is accomplished as follows:

- Subfolders in a regular folder are always treated as a job folder; i.e. the subfolder and its contents are moved along as a single entity.
- Certain flow elements (such as Submit Hierarchy and Archive Hierarchy) have special provisions to support a mixture of subfolder hierarchies and job folders; these provisions are configured through the flow element's properties.

Thus the complexity of dealing with both concepts at the same time is limited to those special flow elements.

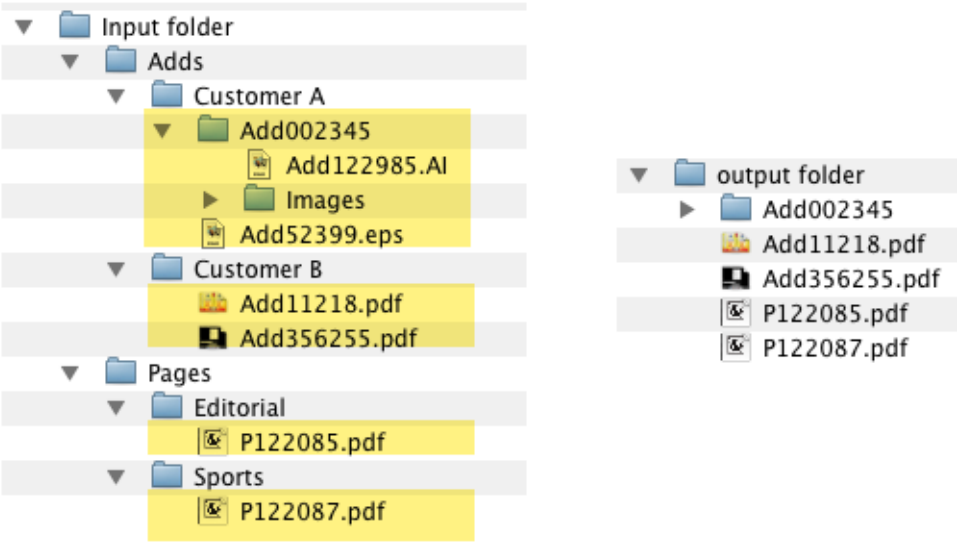
Working with subfolders

Submit hierarchy

The "Submit hierarchy" tool (and its sibling FTP receive) can be used to fetch files that are delivered in a hierarchy of subfolders. The tool looks for files in the nested subfolder structure up to a certain level (specified in a property), and injects those files into the flow along its output connection(s). The injected files are placed in the output folder(s) at the highest level, in effect flattening the subfolder hierarchy. However, if so requested, the original location in the hierarchy is stored with the file (in its internal job ticket) so that it can be retrieved later to recreate the hierarchy. See *Using hierarchy info* on page 232 for more details.

If a subfolder occurs in the hierarchy on a deeper nesting level than what is specified in the "Subfolder levels" property, it is treated as a job folder (i.e. it is moved along as a single entity). Thus, in effect, the "Subfolder levels" property determines which subfolders in the hierarchy should be treated as "hierarchy folders" and which should be treated as job folders.

In the example below you can see the input folder and the corresponding output folder, using Subfolder levels set at **2**.



If you do not want to support job folders, set the "subfolder levels" property to a very high value (for example, 999). This will cause all files to be processed separately, regardless of their nesting level in the hierarchy.

Using the Submit Hierarchy function eliminates the need to set up individual input folders on a user by user basis. In the example above, by just adding another sub folder for "Customer C", any job files or folders put in that folder would be seen and processed by Switch without any additional changes to that workflow.

Archive hierarchy

When archiving files (or job folders), you might want to recreate the subfolder hierarchy that was used to deliver them, or you may want to create a different subfolder hierarchy based on which route files took in a flow. Even though the files have been retrieved from different locations and have been moved along the flow through various processing steps, the internal job ticket for each file can remember the information needed to place the file in its appropriate location in the hierarchy.

The archive hierarchy tool extracts this information and creates the corresponding hierarchy (you can still limit the number of subfolder levels to be recreated regardless of the information stored in the internal job ticket). See *Using hierarchy info* on page 232 for more details.

Working with job folders

Any folder (and its contents) that should be processed as one entity is considered to be a job folder. A job folder usually contains files and/or subfolders (which can contain other files and folders, recursively). Examples include a page layout with its accompanying images and fonts, and the individual pages in a book.

To inject a job folder in a flow, you need an active flow. Otherwise it will take the folder path of this folder as its new input folder and will treat all files as single jobs. The job folder will be moved along the flow and processed as a single entity.

It is also possible to submit job folders through a "Submit hierarchy". In that case you need to make sure that the "Subfolder levels" property is set correctly, as explained in working with subfolders above. For example, if you have a subfolder for each of your customers and these

subfolders contain the jobs, the "Subfolder levels" property should be set to 1. If you would set this property to 2, the job folder would be treated as yet another subfolder level and the files in the job will be processed as separate files.

Job dismantler

In some situations you need to dismantle a job folder and continue with the job's files as separate entities. Often this is because the files arrived inside a folder, but in reality they are not part of a single logical entity. Sometimes you just want to deal with (some of) the components of a job.

For example:

- Customers submit a "job folder" that contains a number of related PDF files, but you really want to preflight each of them separately.
- You use the uncompress tool to unzip a zip archive, resulting in a job folder that contains all of the files from the ZIP archive.
- You want to review each of the images inside a page layout job (outside of the job's context).

In these situations you can use the job dismantler to retrieve the individual files from the job folder.

When you dismantle a job, you need to set the "Subfolder levels" property correctly. This property behaves in the same way as what is explained above for Submit hierarchies i.e. it determines how many levels Switch will search for individual files from the job.

Job assembler

Vice versa, sometimes you need to gather a number of files and keep them together through the rest of the flow.

For example:

- You need to group individual PDF files that will have to be merged into a single document.
- You want to send out an email for every 10 files that arrived in some input folder.
- You would like to insert a file (for example, a preflight report) into an existing job folder.

The job assembler supports various ways of determining which files go together in a job:

- Merge by file name: the file names must contain a numbering scheme (e.g. "page X of Y")
- Complete job every N files: a job is created when N files are collected.
- Complete job every N minutes: a job is created every N minutes.

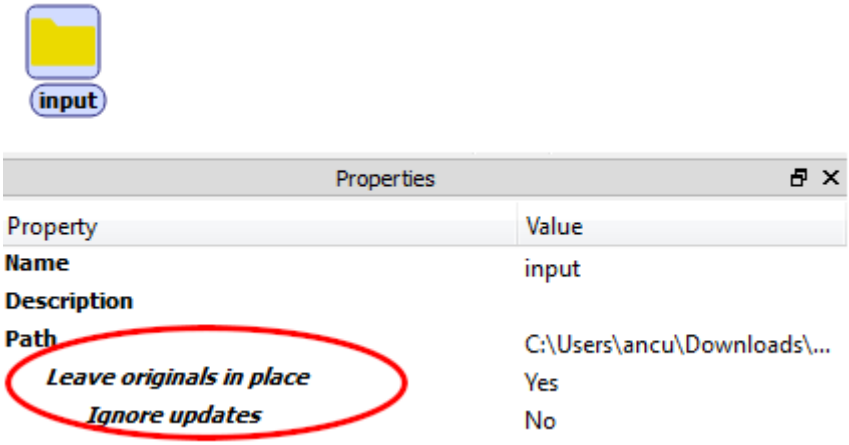
By default all newly created job folders are named "Job" followed by a running count.

To create a job with (nested) subfolders, you can use the same mechanisms as described above for archive hierarchies. See *Using hierarchy info* on page 232 for more details.

Leaving originals in place

By default, Switch moves incoming jobs out of the input folder when injecting them into a flow. Therefore, Switch needs full access rights to rename, create and remove files and folders in the input folder.

However, a number of key flow elements (Folder (*user-managed input*), Submit hierarchy, FTP receive and Mail receive) also support a read-only mode, activated by setting the **Leave originals in place** property for the flow element to **Yes**. In that case, Switch does not write anything to the input folder, so read-only access rights suffice.



Ignore updates

Leave originals in place has "Ignore updates" as subordinate option.

If **Ignore Updates** is set to **Yes**, Switch processes a job only once, ignoring any changes to the job's file size or modification date after it was initially processed. This can be used in workflows where Switch replaces the input job by a processing result, without triggering an endless loop.

If set to **No**, Switch will reprocess a job when its file size or modification date changes. This can be useful when submitting a job with the same name of a previously submitted job. In this case, Switch will use the list of already processed jobs (see below).

How it works

For each flow element operating in read-only mode, Switch maintains a list of all files/ folders in the input folder that were already processed (i.e. actually injected in the flow or skipped due to filters).

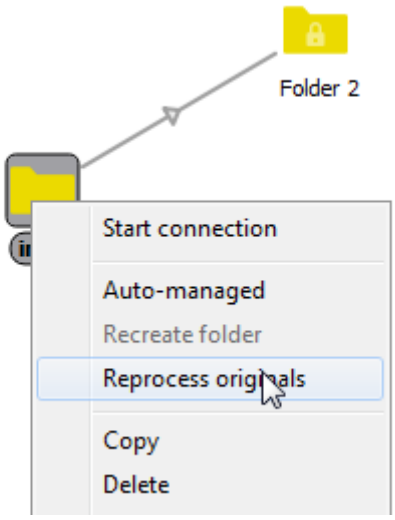
Switch automatically updates the list at regular intervals as follows:

- Items that are updated or replaced in the input folder are reprocessed if "Ignore Updates" is set to "No"; changes are detected by looking at the byte count and at the most recent of creation date and modification date.
- Items that disappear from the input folder are removed from the list (to keep its size down).

Reprocessing originals

The user can manually clear the list of jobs already processed as follows:

- Choose the **Reprocess originals** context menu for the relevant flow element. This causes all remaining original items to be reprocessed when the flow is next activated.
- Certain flow design changes (e.g. set **Leave originals in place** to **No**; change backing folder) automatically clear the list when the flow is next activated.



Configurators

A configurator is a Switch flow element that connects to a third-party application from within a Switch flow. The application must be installed on the same computer as Switch (and it will also be launched on that computer).

You can only use configurators, if you have licensed the Configurator Module.

Note: There is one exception: if you have an active PitStop Sever license, the PitStop Server and the PitStop Server PDF2Image Configurator are always available.

Benefits of a configurator

Depending on the application's characteristics, a Switch configurator provides a lot of benefits:

- The application's settings are configured from within Switch through the configurator's properties, providing a single point of setup for all steps in a flow.
- Interactive applications offering no or limited automation capabilities are turned into fully automated solutions.
- Multiple configurations for the same application can be used in parallel without the need for complex hot folder structures.
- Switch automatically launches the application when it is needed.
- Switch controls all file movement to and from the application, fully integrating its operation with all Switch features including job tracking and logging, processing statistics, and so forth.
- The application's function is documented in the context of the complete flow.

Interacting with other applications

Switch includes configurators for a number of frequently-used applications.

While Enfocus intends to add more configurators in future versions of Switch, it is not feasible to include every relevant application on the market. Switch offers some important options to automate or interact with third-party applications for which there is no configurator:

- The *Generic application tool* allows to control any third-party application that supports hot folders.

- *Execute command* allows to configure command-line applications through the regular Switch user interface (rather than console commands and options).
- The scripting capabilities of Switch allow interaction with the host operating system and with any application that allows scripting.

For more information, refer to the section about the *Configurator Module* on page 358.

Using hierarchy info

A key feature of Switch is its ability to

- Remember a job's origin and routing information, and
- Use this information when placing the job in a folder hierarchy (Example: for archiving).

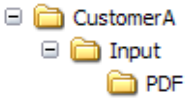
This information is called **hierarchy info**. It is stored in the job's internal job ticket under the form of a hierarchy location path, as described below.

See also *Working with folders* on page 226.

Hierarchy location path

The hierarchy location path (stored in a job's internal job ticket) consists of zero or more segments, and each segment represents the name of a (sub)folder in a nested folder structure. The first segment represents the top-level folder.

For example, the hierarchy location path consisting of the segments "CustomerA", "Input" and "PDF", in that order, represents the following folder structure:



Remembering hierarchy info

Most producers allow remembering hierarchy info depending on a job's origin, and provide properties to configure what's remembered. For example, a "Submit hierarchy" element allows remembering its own name and/or the relative path to the subfolder where the job was submitted.

A folder allows adding the folder name to the location path (at the top or at the bottom). This can be used to create additional hierarchy levels. For example, separating input and output jobs for each customer.

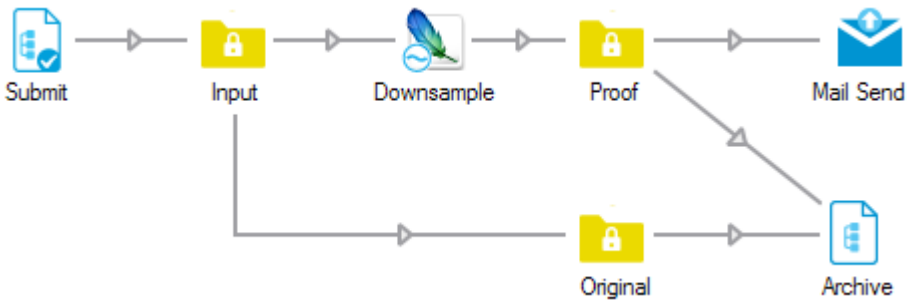
Using hierarchy info

Some elements, and most notably the archive hierarchy, use the hierarchy information remembered for each job to place the job in an appropriate nested folder structure.

Switch automatically creates any folders needed for the (nested) hierarchy.

Example

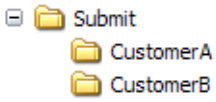
For example, consider this flow:



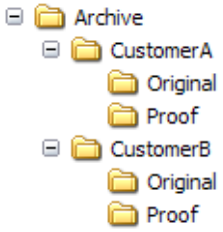
And the following configuration details:

- Submit is configured to remember one level of subfolders, and those subfolders are named for different customers.
- Downsample is configured to produce a JPEG thumbnail of the incoming image file.
- Proof and Original are configured to add their own folder name at the bottom of the hierarchy location path.
- Archive is configured to accept two subfolder levels.

Then the following Submit hierarchy:



Will result in this Archive hierarchy:



Specifically, submitting a file named "File.tif" in folder Submit/CustomerA will result in two archived files (in addition to the proof being mailed out):

- The original "File.tif" will be placed in Archive/CustomerA/Original.
- The downsampled copy "File.jpg" will be placed in Archive/CustomerA/Proof.

And naturally submitting a file in folder Submit/CustomerB will result in two archived files under the Archive/CustomerB/... structure.

Using email info in Switch

A key feature of Switch is the ability to attach email information to the jobs that are being processed and use this info to send notifications or receipts.

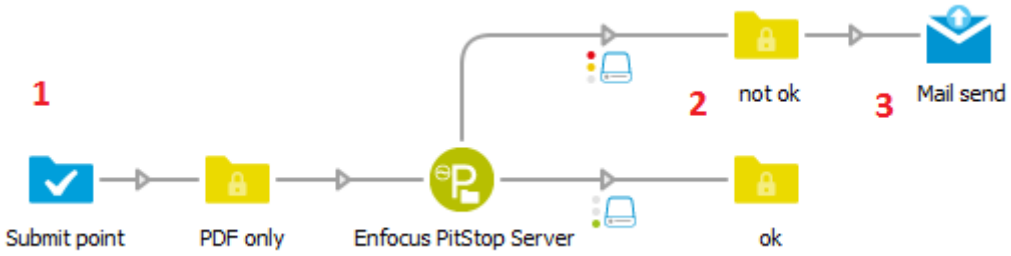
For example:

- If jobs are submitted through e-mail, Switch can use the sender's email address to send him/her a receipt.
- Additional email info (email addresses or body text) may be attached to a job, e.g. to also inform customer sales representatives or operators of new jobs that were injected in the flow.
- If jobs are submitted in a folder hierarchy, notifications can be sent based on the folder the job is in. This is useful if the folders have the name of the customers or refer to the type of job being submitted.

"Email info" in Switch refers to both (a list of) email addresses and body text. This information is *stored in the job's internal job ticket*, so it can move along the Switch flows as metadata and be retrieved through variables ([Job.EmailBody] and [Job.EmailAddress]).

Note that Switch combines new email information with any email information already present. Email addresses are added to the list, and body text is appended to what's there (inserting a line break if needed). Existing email info is never removed.

The following topics explain how you can attach email info to a job in Switch and how this info can be used to send the appropriate email message to the appropriate recipient. This is also illustrated in the following example flow:



1. Email info is attached when the job comes in. In this example, jobs are submitted via a Submit point and for example the email address of the user submitting the job is attached.
2. Extra email info is attached when the job is moving along the flow. In this example, the preflight status is added as email info.
3. The attached email info is used when (part of the) processing is finished to notify operators, customers or sales representatives. The Mail send tool is needed to send the notifications.

Attaching email info to a job - flow elements

Associating email information with jobs submitted to Switch is possible through the configuration of the relevant **flow element properties**. Not all flow elements support email information; only the ones that have properties related to email info. These properties must be configured appropriately as described further in this document.

Note: Remember that the (email) info attached to the job can be used by other flow elements that support variables.

The following table gives an overview of the flow elements that allow you to attach email info to the job's internal job ticket.

Flow element	Properties
Mail receive (submitted jobs)	• **Attach email info**: if enabled, the sender's email address (*not the body text!*) is copied to the job's metadata. • **Attach extra email info**: allows you to add extra email addresses or body text to the job's metadata. You can define different email info depending on who's the sender (email address or email account name), or what's in the message subject line. For example, you could attach mail X to jobs from customer X and mail Y to jobs from customer Y. How to do this is explained in *Attaching email info - the email info map* on page 236.
FTP receive (submitted jobs)	**Attach email info**: allows you to associate email addresses and body text based on the name of the folder on the FTP server that holds the job. This is useful if the folder name reflects the type of job, or if it refers to the customer.
Submit hierarchy (submitted jobs)	**Attach email info**: allows you to associate email addresses and body text based on the name of the folder the job resides in. This is useful if the folder name reflects the type of job, or if it refers to the customer.
Folder (submitted jobs + jobs moving along the flow)	• **Attach email addresses**: allows you to add one or more email addresses. • **Attach email body text**: allows you to add an email message. Note that here it is not possible to differentiate between jobs; all jobs will get associated with the same list of addresses and with the same body text. Some use cases: • Accumulate an audit trail of status messages in the email body text as a job moves along a flow, and email the audit trail to a supervisor at the end of the flow. • Associate a different email address with a job depending on its status in the flow (e.g. passed preflight test or not). • Sort jobs based on filename (or any other criteria) and then associate a different email address with a job depending in how it was sorted.
Job Dismantler (jobs moving along the flow)	**Attach email info**: allows you to associate email addresses and body text based on the folder name the job belongs to. This is useful if the folder name reflects the type of job, or if it refers to the customer.

Flow elements that become available if you have licensed the SwitchClient Module also allow attaching email info, as shown in the table below. For more info, refer to the *SwitchClient Module* on page 459.

Flow element	Properties
Submit point	• **Attach user as email info**: allows you to add the email address of the user that submits the job to Switch. • **Attach extra email info**: allows you to add extra email information. The information added can vary depending on the user submitting the job.
Checkpoint	**Attach user as email info**: allows you to add the email address of the user that handles the job.

Attaching email info - the email info map

How it works

In order to differentiate between the different jobs and the email addresses/messages that have to be associated with them, you must build a mapping table (called email info map).

Each entry in that map consists out of three elements:

- **A key**, used to identify the job and to determine which message/address(es) must be attached.
  - In case of FTP receive, Submit hierarchy, Folder and Job dismantler, this is a folder name.
  - In case of a Submit point, this is the name of the Switch user that submits the job.
  - In case of Mail receive, this is the sender's email address or email account or a key word that must be present in the mail subject line (depending on what you select in the **Base map key on** property (subordinate property of **Attach extra email info**).

  By default, the mapping table contains an entry for the special key *<all>*. This entry allows you to specify **email info that should be added to all jobs**, regardless of their key. If this key is left empty, however, it will be ignored.
- **One or more email addresses** that will be attached to the job. Make sure to use semicolons (not surrounded by spaces) to separate the email addresses.
- An **email message** consisting of one or more paragraphs. You can use Switch variables in your body text, for example to refer to the name of the job.

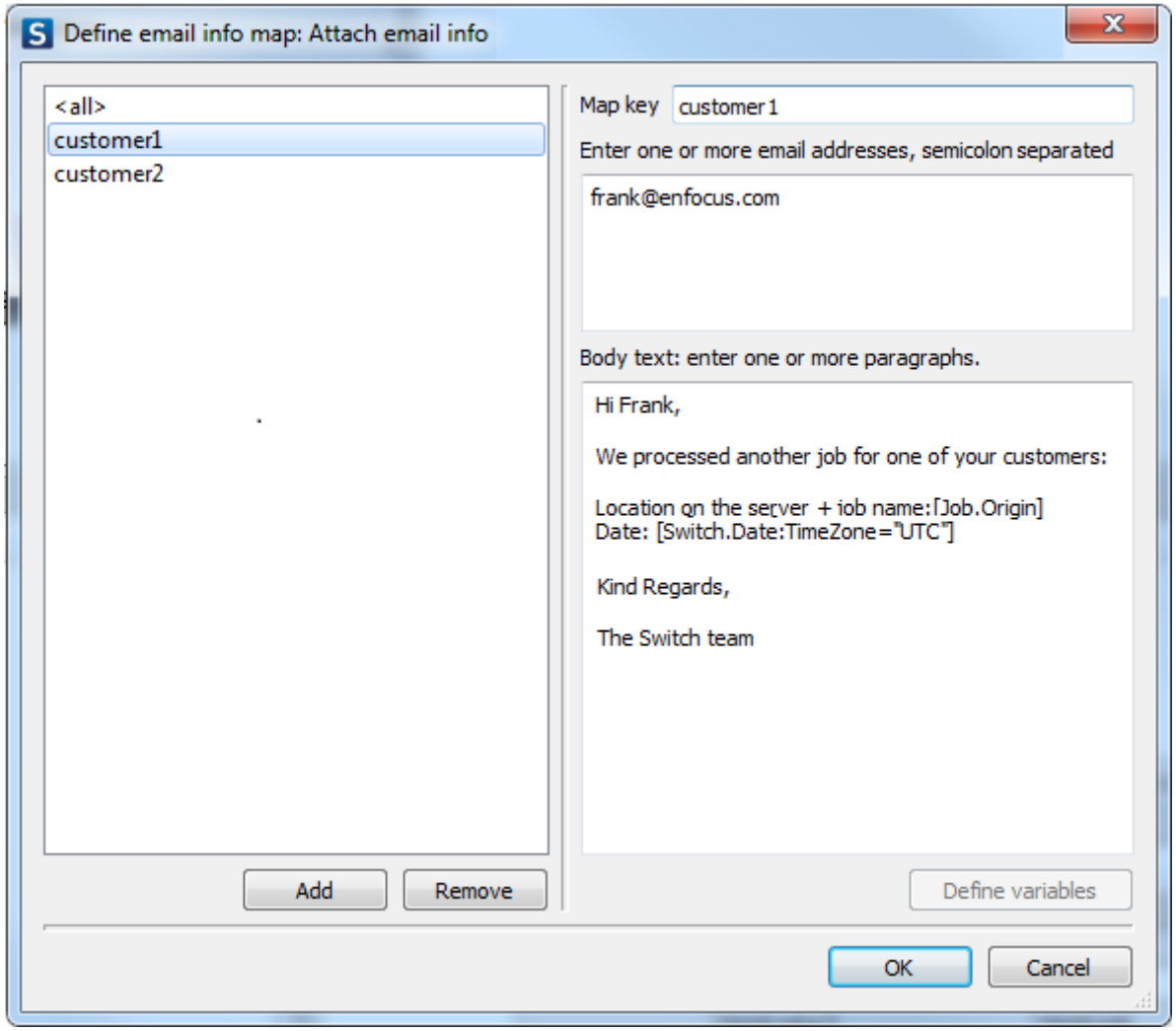
The email info map can contain as many entries as you need. Note that the order of the entries in the map is not important.

Example 1: Attaching email info through FTP receive

Let's say that you've set up an FTP site where your customers submit jobs.There is a separate subfolder for each of your customers (with the appropriate access rights) and you want to make sure that the responsible account manager is informed.

To achieve this:

1. Configure an FTP receive flow element. Make sure to check all the relevant subfolders (see "Subfolder levels" property).
2. Click **Attach email info** and create an email info map, mapping the name of the customer's subfolder (the "key") to the responsible account manager's email address, as shown below. Note that you could enter the customer's email address as well, as required.
3. Further in the flow, configure a Mail send flow element (see *Using attached email info* on page 238).



Note:

- FTP receive always uses subfolder names as the key, whereas as Mail receive allows selecting the basis for the key ("base map key on").
- It is possible to have multiple key matches for the same job. For example, if a job is submitted in a nested subfolder some levels deep, FTP receive uses each of the subfolder names in the nested subfolder path as a key in the mapping table. The email information for all matches is combined and associated with the job. This is also the case for the <all> key.

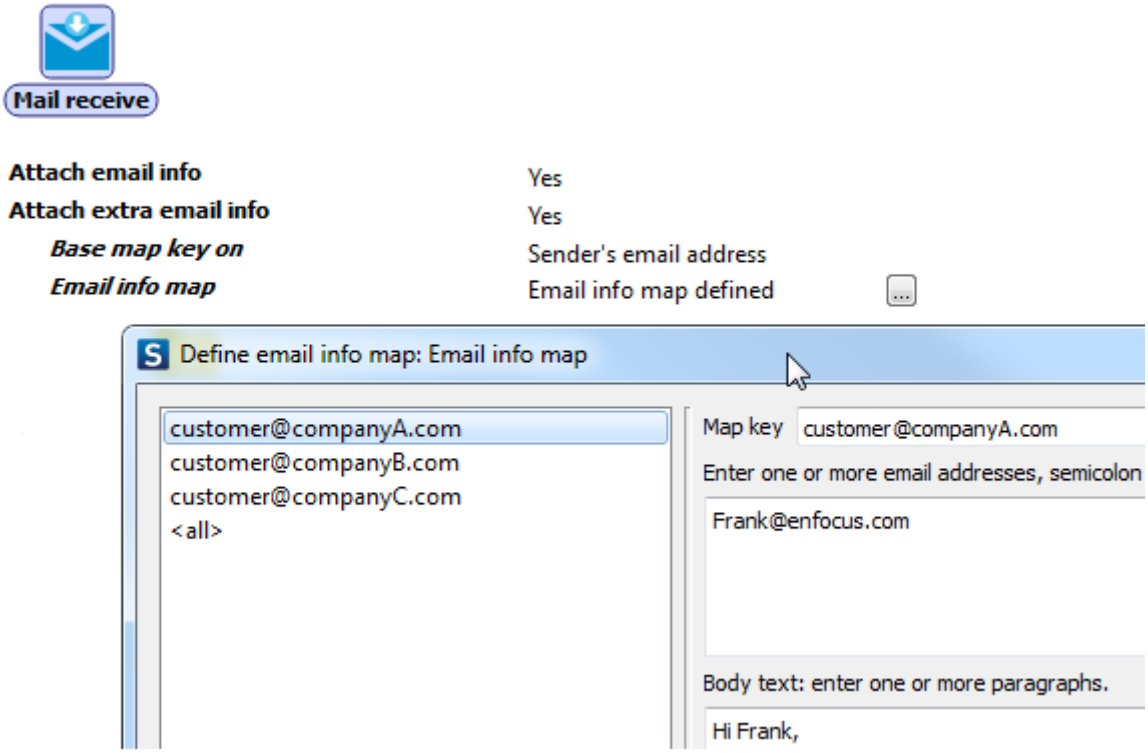
Example 2: Attaching email info through Mail receive

Suppose the jobs in your flows are submitted through mail. You want to attach the sender's email address (for future reference) as well as the account manager's email address.

In order to achieve this:

1. Configure a Mail receive flow element.
2. Set **Attach email info** to **Yes**, to make sure the sender's email address is stored.

3. Set **Attach extra email info** to **Yes** and configure the subordinate properties:
   - Base map key on **Sender's email address**.
   - Create an email info map, making sure the keys are your customer's email addresses. Note that the email address in the map key can be either the complete email address or only the part in front of/following the @ sign.



Note: In the above example, jobs from customers that are NOT in the list will match the <all> key. Jobs from customers that are listed, will be associated with the corresponding email address info AND with the info behind the <all> key.

Using attached email info

There are two ways to use email info attached to jobs in Switch:

- You can use the **variables related to email**, such as [Job.EmailAddress] and [Job.Emailbody], at any stage in the flow.
- You can use the attached info email in the **Mail send** flow element, using the following properties:
  - **Include attached addresses**
  - **Include attached body text**

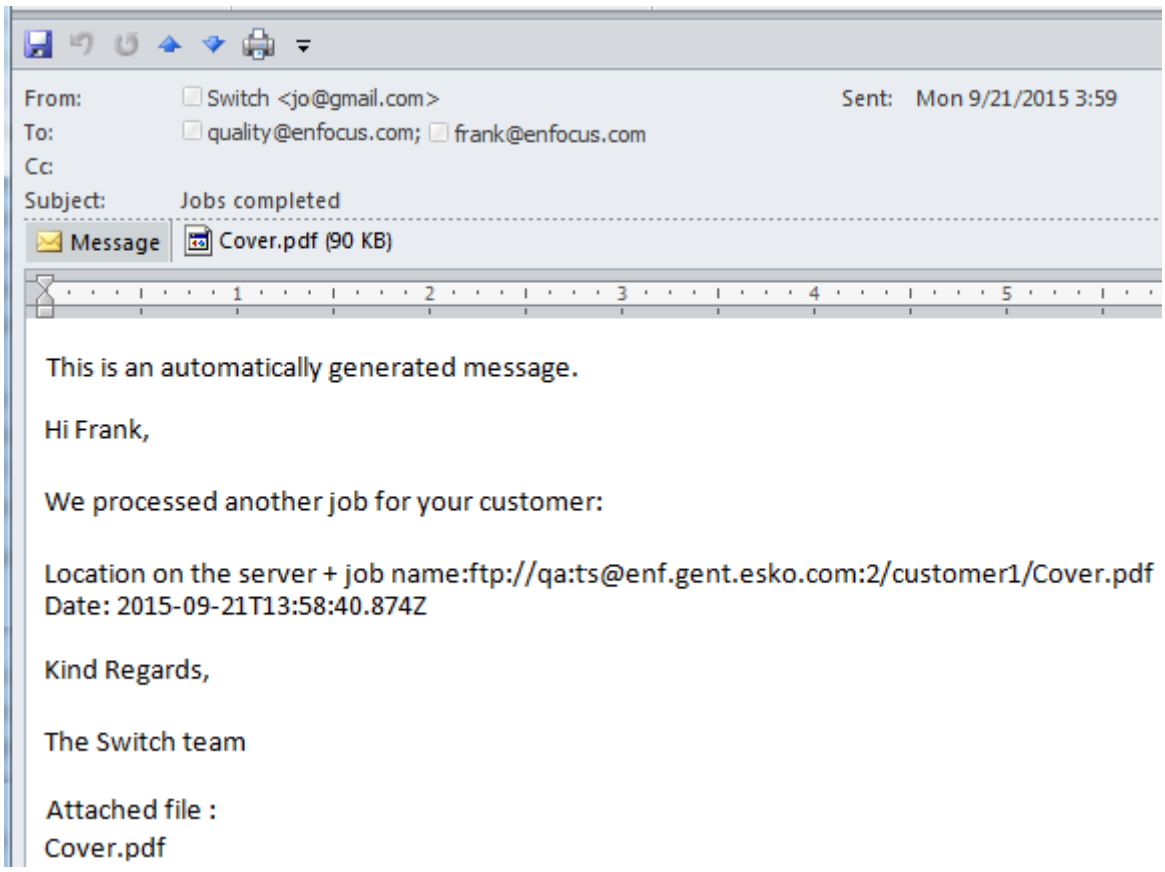
Example

Properties:

Properties	
Property	Value
Name	Mail send
Description	Send notification to account manager and customer
Subject	Jobs completed
To addresses	quality@enfocus.com
Include attached addresses	Yes
CC addresses	
BCC addresses	
Reply address	Default
Message format	Plain text
Body template	Built-in
Body text	This is an automatically generated message.
Include attached body text	Yes
Attach files	Yes
Strip unique name	Yes

Below is an example of a mail sent via a Mail send flow element with the properties shown higher:

- The email address in the **From** field is the address specified in the Switch *Mail send preferences* (User name property).
- The **To** field contains the email address(es) entered in the To addresses property (of Mail send) and the addresses attached to the job concerned.
- The **Subject** is the one specified in Mail send - Subject.
- The job file is attached.
- The body text contains the phrase "This is an automatically generated message" followed by the email message that was attached to the job earlier in the Switch flow.



Note that this message contains two variables that were selected when configuring the email message: [Job.Origin] and [Switch.Date:TimeZone="UTC"].

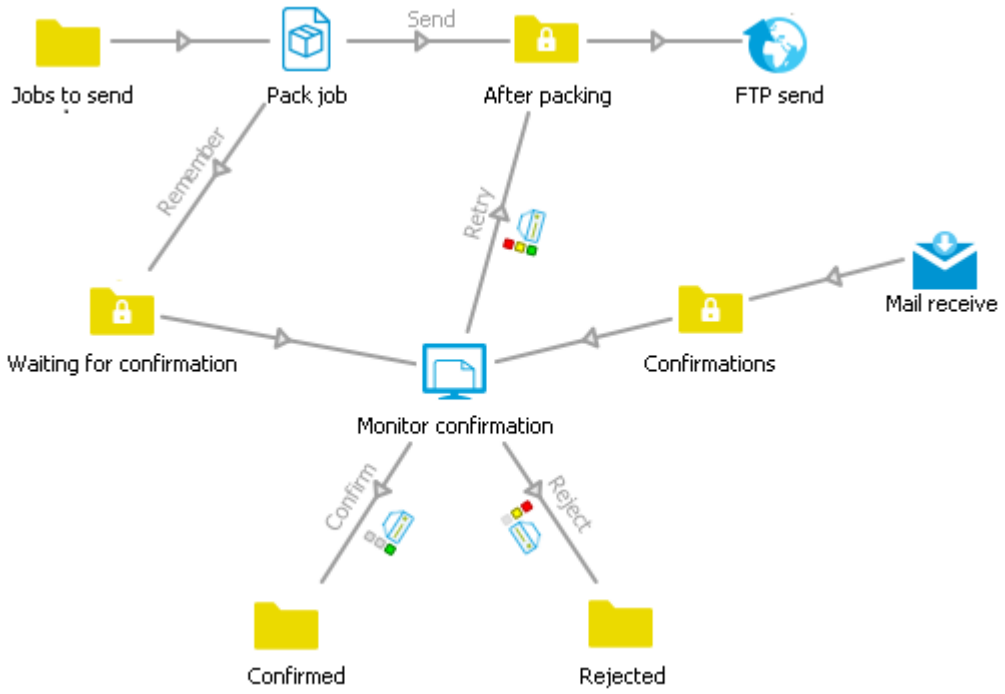
Note: Users of the Switch Web Portal can use the attached email info in a similar way with *Checkpoint via mail* on page 184 to send reply messages for jobs arriving in the Checkpoint.

Acknowledged job hand-off

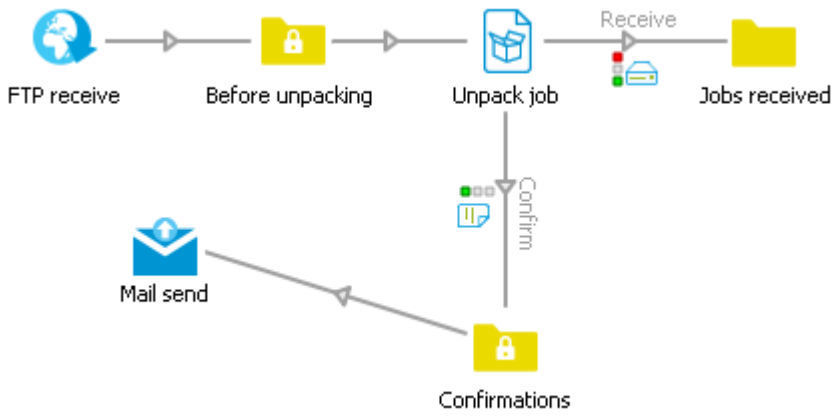
The Pack job, Unpack job, and Monitor confirmation tools can be used to implement acknowledged hand-off of jobs between instances of Switch running on separate computers, regardless of the communication channel used to transfer the data. The involved instances of Switch may reside on the same local network, or they may be in remote locations connected through the Internet (or any other communications channel).

Furthermore, Pack job and Unpack job can carry over any Switch metadata associated with the job, including internal job ticket information (such as email and hierarchy information), external metadata and (of course) embedded metadata. This feature can be used with or without acknowledged hand-off.

Example flow on sender's side



Example flow on receiver's side



Specifying file filters

Several Switch tools offer file or folder filter properties, including for example:

- the "Include/exclude these jobs" properties on connections leaving a folder.
- the "Include/exclude these folders" properties on connections leaving an FTP receive instance.

Each of these properties can be set to a particular file or folder filter that "matches" a certain category of jobs based on the filter's characteristics.

File filters

A file filter is applied to a job (file or job folder) being submitted to or moving along a flow. The following table lists the various supported filter types.

Filter type	Description
All jobs	Matches all files and job folders; is used as the default for "Include" properties
No jobs	Matches no files or job folders; is used as the default for "Exclude" properties
All other jobs	Matches all files and job folders not moved by any other connection (see All other files for more details)
Define file types	A predefined list of cross-platform file types. A file matches the filter if its Mac file and creator types and/or its filename extension match any of the specified types A job folder matches the filter if any of the files at the topmost level inside the folder match any of the specified types (or if the list of types contains the special "Folder" type)
Define file patterns	A list of filename pattern strings entered in a dialog; a pattern includes one or more of the following wildcard characters (in addition to regular characters that must match exactly): • * (asterisk): matches zero or more arbitrary consecutive characters • ? (question mark): matches exactly one arbitrary character A file matches the filter if its filename matches any of the patterns in the list. A job folder matches the filter if its folder name matches any of the patterns in the list.
Define regular expression	A regular expression (i.e. a more complex pattern; see *Regular Expressions* on page 248 for more details) A file matches the filter if its filename completely matches the regular expression. A job folder matches the filter if its folder name completely matches the regular expression.
Define condition with variables	A condition expressed through variables; see *Defining a condition with variables* on page 387

Filter type	Description
Define script expression	A script expression that returns a **Boolean result (true or false)**

All other files

A common problem while creating connections from a flow element is how to capture those files or job folders not matched by any other connection. The "All other jobs" filter addresses this problem; all files or job folders that do not match one of the connections with another filter (example: file type, file pattern, regular expression) are matched by this filter.

For example: imagine a flow element with one connection that matches all PDF files and a second connection that matches all PostScript files. Adding a third connection where the "Include these jobs" property is set to "All other jobs" causes all files that are not PDF or PostScript to be matched (i.e. moved through this third connection).

A flow element can have more than one outgoing connection that uses the "All other jobs" filter. In that case all of these connections match the same set of files and job folders: those not matched by other connections using e.g. file type, file pattern or regular expression filters.

Folder filters

A folder filter is applied to a subfolder of the folder hierarchy from which files are being retrieved.

Filter type	Description
All folders	Matches all folders; is used as the default for "Include" properties
No folders	Matches no folders; is used as the default for "Exclude" properties
All other folders	Matches all folders not matched by any other connection; the semantics are similar to the "All other jobs" file filter (see All other jobs for more details)
Folder patterns	A list of folder name pattern strings entered in a dialog; a pattern includes one or more of the following wildcard characters (in addition to regular characters that must match exactly): • * (asterisk): matches zero or more arbitrary consecutive characters • ? (question mark): matches exactly one arbitrary character A folder matches the filter if its folder name matches any of the patterns in the list
Regular expression	A regular expression (i.e. a more complex pattern; see the separate topic for more details)

Filter type	Description
	A folder matches the filter if its folder name completely matches the regular expression
Script expression	A script expression that returns a Boolean result (true or false)

Process these folders

The objective is to offer more flexibility for defining the subset of the folder hierarchy to be processed. This is accomplished by offering a variable list of powerful rules.

Properties

The tool offers the following new properties:

Property name	Description	Editors	Default
Process these folders	Defines the 'initial' set of folders that should be processed by the submit hierarchy tool; this set can be adjusted by defining one or more rules in subsequent properties Possible values are: • All folders • No folders	Dropdown list	All folders
Adjusted by (rule 1)	Defines a rule for adjusting the set of folders that should be processed by including or excluding folders Possible values are: • Including folders named • Including folders not named • Excluding folders named • Excluding folders not named	Dropdown list	None
.. Folder name	A pattern for the folder name to be included or excluded	Folder patterns Regular expression Script expression	Empty

Property name	Description	Editors	Default
.. On levels	The level or range of levels to which this rule applies, in the same format as the old "Subfolder range" property	Single-line text	Empty
.. Restriction	Defines an optional restriction on the parent or ancestors for the folder in this rule Possile values are: • None • With immediate parent named • With no immediate parent named • With any ancestor named • With no ancestor named	Dropdown list	None
.... Parent name or .... Ancestor name	A pattern for the folder name of the parent or ancestor	Folder patterns Regular expression Script expression	Empty
.. Nesting	Defines whether this rule operates on subfolders of the target folder, which are deeper in the hierarchy than the defined level range. The matching rule is also applied on these subfolders. Possible values for "including" rule are: • Include nested subfolders as well • Don't include nested subfolders Possible values for "excluding" rule are: • Exclude nested subfolders as well • Dont exclude nested subfolders	Dropdown list	"Don't include..." or "Exclude..."

Property name	Description	Editors	Default
Adjusted by (rule 2) .... Adjusted by (rule 5)	Same as rule 1 with an identical set of dependent properties		

Applying rules

The rules are applied in the same order as they are specified. It is perfectly possible for a rule to exclude folders that were included by a previous rule, or vice versa.

For example, consider a hierarchy with two levels (in addition to the root folder) and where each level has three folders called A, B, C. Now, consider the following rules:

- Start with no folders
- Include folders named C on level 2 (with or without nesting)
- Exclude folders named C on level 1 (with nesting)

These rules will process all jobs in folders A/C and A/B, but not in folder C/C (because it was excluded in the second rule), and not in any of the other folders (because they were never included to begin with).

Reversing the order of the rules would change the result (files in folder C/C will be processed as well), because excluding something from an empty set has no effect.

Upgrading

When upgrading from a previous version of Switch, the new properties are initialized as follows:

- The new "Process these folders" property is set to "All folders"
- If the old "Process only these folders" property is not set to "All folders", a rule is created as indicated in the following table
- If the old "Skip these folders" property is not set to "No folders", a rule is created as indicated in the following table

If both old properties are present, the rules are listed in the order presented above (although the order is not important).

Property name	Value for "Process only these folders"	Value for "Skip these folders"
Adjusted by	"Excluding folders not named"	"Excluding folders named"
.. Folder name	The value of the "Process only these folders" property	The value of the "Skip these folders" property
.. On levels	The value of the corresponding dependent property	The value of the corresponding dependent property
.. Restriction	"None"	"None"
.. Nesting	"Exclude nested subfolders as well"	"Exclude nested subfolders as well"

These values should produce the same behavior as in the previous Switch version.

Unique name prefixes

Internal job tickets

A key feature of Switch is its ability to remember information about a job (file or job folder) while it is being processed through a flow. This information is stored in an internal job ticket managed by Switch.

The internal job ticket for each job contains housekeeping information (such as where the job was last located) in addition to information about the job's origin and routing.

For example, a job's hierarchy info and email info (attached by specific tools) are stored in its internal job ticket.

Switch needs a way to associate a particular internal job ticket with its corresponding job, and vice versa. To maximize flexibility and transparency for the user, Switch uses the filename as the basis for this mechanism rather than hiding jobs in some database. However Switch may be handed two or more jobs with the same name (in different input folders, or even in the same input folder after the first job was moved along).

Thus Switch employs a "trick" to keep similarly named jobs apart: unique name prefixes.

Unique name prefixes

A job is associated with its internal job ticket by prefixing the file or folder name with a unique identifier that consists of five letters or digits preceded and followed by an underscore.

For example: "myjob.txt" may become "_0G63D_myjob.txt".

Note that the files inside a job folder are not renamed; only the job folder name receives the unique name prefix. When a job folder is disassembled into separate files, each of the files of course receives its own unique name prefix.

For the technically-minded: each of the five characters in the unique name prefix can be a digit (0-9) or an uppercase letter (A-Z). This allows 36^5 or about 60 million combinations. A different unique name prefix can be generated every second for about 23 months.

Switch generates a new unique name prefix (and a corresponding internal job ticket) when:

- It detects a job in a folder or in a submit hierarchy.
- It makes a copy of a job.
- A producer (such as email receive) injects a new job in the flow.
- A processor produces a secondary output job that is injected in the flow.

The primary output of a processor (i.e. the incoming job with any changes applied by the processor) retains the same unique name prefix as the incoming job.

When a job loses its unique name prefix (for example because the "strip unique name" property is set for an archive or a final folder), it also loses the association with its internal job ticket.

Handing over jobs between flows

Switch can pass along a job from one flow to another without loosing the job's association with its internal job ticket (assuming both flows are being executed by the same instance of Switch; hand-over between different instances of Switch does not preserve the internal job ticket information at this time).

This feature enables splitting up a complex flow in smaller segments without losing any information.

To hand over jobs from flow A to flow B:

- In flow A, create a user-managed folder with no outgoing connections and make sure its "strip unique name" property is set to No.
- In flow B, create a user-managed folder with the same backing folder (the folder in flow B may or may not have incoming connections).

Note: Switch cleans up job tickets in end folders at a regular interval as set in the *Application Data* preference. Make sure that the job ticket is handed over to the second flow in a timely manner.

Regular Expressions

Note: The contents of this topic is adapted from documentation provided by Trolltech.

Introduction

Regular expressions, or "regexps", provide a way to find patterns within text. This is useful in many contexts, for example a regexp can be used to check whether a piece of text meets some criteria. In Switch a regular expression can be used to sort files based on some naming scheme: only files with a name that matches the regular expression are allowed to pass through a certain connection.

While this is almost surely of no concern for the use of regexps in Switch, it is good to know that not all regexp implementations are created equal. Most implementations provide identical results for basic expressions, but the results for more advanced expressions and matches may differ in subtle ways.

The Switch regexp language is modeled on Perl's regexp language, A good reference on regexps is **Mastering Regular Expressions: Powerful Techniques for Perl and Other Tools** by Jeffrey E. Friedl, ISBN 1565922573. Several web sites offer tools for working with regexps or provide libraries with examples for matching all sorts of patterns. One simple tool to start playing with regexps can be found at http://www.roblocher.com/technotes/regexp.aspx.

Brief tutorial

Regexps are built up from expressions, quantifiers, and assertions. The simplest form of expression is simply a character, example, **x** or **5**. An expression can also be a set of characters. For example, [**ABCD**] will match an **A** or a **B** or a **C** or a **D**. As a shorthand we could write this as [**A-D**]. If we want to match any of the capital letters in the English alphabet we can write [**A-Z**]. A quantifier tells the regexp engine how many occurrences of the expression we want, e.g. **x{1,1}** means match an x which occurs at least once and at most once. We will look at assertions and more complex expressions later.

We will start by writing a regexp to match integers in the range 0 to 99. We will require at least one digit so we will start with **[0-9]{1,1}** which means match a digit exactly once. This regexp alone will match integers in the range 0 to 9. To match one or two digits we can increase the maximum number of occurrences so the regexp becomes **[0-9]{1,2}** meaning match a digit at least once and at most twice. However, this regexp as it stands will not match correctly. This regexp will match one or two digits within a string. To ensure that we match against the whole string we must use the anchor assertions. We need **^** (caret) which when it is the first character in the regexp means that the regexp must match from the beginning of the string. And we also need **$** (dollar) which when it is the last character in the regexp means that the regexp must match until the end of the string. So now our regexp is **^[0-9]{1,2}$**. Note that assertions, such as ^ and $, do not match any characters.

If you have seen regexps elsewhere, they may have looked different from the ones above.

This is because some sets of characters and some quantifiers are so common that they have special symbols to represent them. **[0-9]** can be replaced with the symbol **\d**.

The quantifier to match exactly one occurrence, **{1,1}**, can be replaced with the expression itself. This means that **x{1,1}** is exactly the same as **x** alone. So our 0 to 99 matcher could be written **^\d{1,2}$**. Another way of writing it would be **^\d\d{0,1}$**, i.e. from the start of the string match a digit followed by zero or one digits. In practice most people would write it **^\d \d?$**. The **?** is a shorthand for the quantifier **{0,1}**, i.e. a minimum of no occurrences and a maximum of one occurrence. This is used to make an expression optional. The regexp **^\d\d?$** means "from the beginning of the string match one digit followed by zero or one digits and then the end of the string".

Our second example is matching the words 'mail', 'letter' or 'correspondence' but without matching 'email', 'mailman', 'mailer', 'letterbox' etc. We will start by just matching 'mail'. In full the regexp is **m{1,1}a{1,1}i{1,1}l{1,1}**, but since each expression itself is automatically quantified by {1,1} we can simply write this as **mail**; an **m** followed by an **a** followed by an **i** followed by an **l**. The symbol **|** (bar) is used for alternation, so our regexp now becomes **mail|letter|correspondence** which means match 'mail' or 'letter' or 'correspondence'. Whilst this regexp will find the words we want it will also find words we do not want such as 'email'.

We will start by putting our regexp in parentheses, **(mail|letter|correspondence)**.

Parentheses have two effects, firstly they group expressions together and secondly they identify parts of the regexp that we wish to capture for reuse later on. Our regexp still matches any of the three words but now they are grouped together as a unit. This is useful for building up more complex regexps. It is also useful because it allows us to examine which of the words actually matched.

We need to use another assertion, this time **\b** "word boundary": **\b(mail|letter|correspondence)\b**.

This regexp means "match a word boundary followed by the expression in parentheses followed by another word boundary". The **\b** assertion matches at a position in the regexp not a character in the regexp. A word boundary is any non-word character such as a space, a newline or the beginning or end of the string.

Characters and abbreviations for sets of characters

Element	Meaning
c	Any character represents itself unless it has a special regexp meaning. Thus c matches the character c.
\c	A character that follows a backslash matches the character itself except where mentioned below. For example if you wished to match a literal caret at the beginning of a stringyou would write \^.
\a	This matches the ASCII bell character (BEL, 0x07).
\f	This matches the ASCII form feed character (FF, 0x0C).
\n	This matches the ASCII line feed character (LF, 0x0A, Unix newline).
\r	This matches the ASCII carriage return character (CR, 0x0D).
\t	This matches the ASCII horizontal tab character (HT, 0x09).
\v	This matches the ASCII vertical tab character (VT, 0x0B).
\xhhhh	This matches the Unicode character corresponding to the hexadecimal number hhhh (between 0x0000 and 0xFFFF).
\0ooo	(i.e. zero ooo) This matches the ASCII/Latin1 character corresponding to the octal number ooo (between 0 and 0377).
.	(i.e. period) This matches any character (including newline).
\d	This matches a digit.
\D	This matches a non-digit.
\s	This matches a whitespace.
\S	This matches a non-whitespace.
\w	This matches a word character (letter or number or underscore).
\W	This matches a non-word character.
\n	This matches the n-th backreference, e.g. \1, \2, etc.

Sets of characters

Square brackets are used to match any character in the set of characters contained within the square brackets. All the character set abbreviations described above can be used within square brackets. Apart from the character set abbreviations and the following two exceptions no characters have special meanings in square brackets.

Character	Meaning
^	The caret negates the character set if it occurs as the first character, that is immediately after the opening square bracket. For example, [abc] matches 'a' or 'b' or 'c', but [^abc] matches anything except 'a' or 'b' or 'c'.
-	The dash is used to indicate a range of characters, for example, [W-Z] matches 'W' or 'X' or 'Y' or 'Z'.

Using the predefined character set abbreviations is more portable than using character ranges across platforms and languages. For example, [0-9] matches a digit in Western alphabets but \d matches a digit in any alphabet.

Note that in most regexp literature sets of characters are called "character classes".

Quantifiers

By default an expression is automatically quantified by **{1,1}**, i.e. it should occur exactly once. In the following list **E** stands for any expression. An expression is a character or an abbreviation for a set of characters or a set of characters in square brackets or any parenthesized expression.

Quantifier	Meaning
E?	Matches zero or one occurrence of E. This quantifier means "the previous expression is optional" since it will match whether or not the expression occurs in the string. It is the same as **E{0,1}**. For example **dents?** will match 'dent' and 'dents'.
E+	Matches one or more occurrences of E. This is the same as **E{1,}**. For example, **0+** will match '0', '00', '000', etc.
E*	Matches zero or more occurrences of E. This is the same as **E{0,}**. The * quantifier is often used by mistake. Since it matches zero or more occurrences it will match no occurrences at all. For example if we want to match strings that end in whitespace and use the regexp **\s*$** we would get a match on every string. This is because we have said find zero or more whitespace followed by the end of string, so even strings that don't end in whitespace will match. The regexp we want in this case is **\s+$** to match strings that have at least one whitespace at the end.
E{n}	Matches exactly n occurrences of E. This is the same as repeating the expression n times. For example, **x{5}** is the same as **xxxxx**. It is also the same as **E{n,n}**, e.g. **x{5,5}**.
E{n,}	Matches at least n occurrences of E.
E{,m}	Matches at most m occurrences of E. This is the same as **E{0,m}**.
E{n,m}	Matches at least n occurrences of E and at most m occurrences of E.

If we wish to apply a quantifier to more than just the preceding character we can use parentheses to group characters together in an expression. For example, **tag+** matches a 't' followed by an 'a' followed by at least one 'g', whereas **(tag)+** matches at least one occurrence of 'tag'.

Note that quantifiers are "greedy". They will match as much text as they can. For example, 0+ will match as many zeros as it can from the first zero it finds, e.g. '2.0005'.

Capturing text

Parentheses allow us to group elements together so that we can quantify and capture them. For example if we have the expression **mail|letter|correspondence** that matches a string we know that one of the words matched but not which one. Using parentheses allows us to "capture" whatever is matched within their bounds, so if we used **(mail|letter|correspondence)** and matched this regexp against the string "I sent you some email" we would capture 'mail'.

We can use captured text within the regexp itself. To refer to the captured text we use backreferences which are indexed from 1. For example we could search for duplicate words in a string using **\b(\w+)\W+\1\b** which means match a word boundary followed by one or more word characters followed by one or more non-word characters followed by the same text as the first parenthesized expression followed by a word boundary.

If we want to use parentheses purely for grouping and not for capturing we can use the non-capturing syntax, e.g. **(?:green|blue)**. Non-capturing parentheses begin '(?:' and end ')'. In this example we match either 'green' or 'blue' but we do not capture the match so we only know whether or not we matched but not which color we actually found. Using non-capturing parentheses is more efficient than using capturing parentheses since the regexp engine has to do less book-keeping.

Both capturing and non-capturing parentheses may be nested.

Anchors

Anchors match the beginning or end of the string but they do not match any characters.

Regular expressions entered in the Switch user interface always match the complete string. In other words the regexp is automatically anchored at the beginning and at the end of the string, and you shouldn't specify explicit anchors. (Regular expressions specified in a Switch JavaScript program should include explicit anchors as needed).

Anchor	Meaning
^	The caret signifies the beginning of the string. If you wish to match a literal ^ you must escape it by writing \^. For example, **^#include** will only match strings which begin with the characters '#include'. (When the caret is the first character of a character set it has a special meaning, see Sets of Characters.)
$	The dollar signifies the end of the string. For example **\d\s*$** will match strings which end with a digit optionally followed by whitespace. If you wish to match a literal $ you must escape it by writing \$.

Assertions

Assertions make some statement about the text at the point where they occur in the regexp but they do not match any characters. In the following list E stands for any expression.

Assertion	Meaning
\b	A word boundary. For example, the regexp **\bOK\b** means match immediately after a word boundary (example: start of string or whitespace) the letter 'O' then the letter 'K' immediately before another word boundary (example: end of string or whitespace). But note that the assertion does not actually match any whitespace so if we write (**\bOK\b**) and we have a match it will only contain 'OK' even if the string is "It's OK now".
\B	A non-word boundary. This assertion is true wherever **\b** is false. For example, if we searched for **\Bon\B** in "Left on" the match would fail (space and end of string are not non-word boundaries), but it would match in "tonne".
(?=E)	Positive lookahead. This assertion is true if the expression matches at this point in the regexp. For example, **const(?=\s+char)** matches 'const' whenever it is followed by 'char', as in 'static const char *'. (Compare with **const\s+char**, which matches 'static const char *'.)
(?!E)	Negative lookahead. This assertion is true if the expression does not match at this point in the regexp. For example, **const(?!\s+char)** matches 'const' except when it is followed by 'char'.

Note: Positive and negative lookbehind are currently not supported.

Case insensitive matching

You can make the complete regexp case insensitive by surrounding it by the /.../i constuct. More precisely, if the regexp starts with a forward slash and ends with a forward slash followed by the letter i, then matching for the complete regexp is case insensitive.

For example:

Regexp	Matches these strings
ABC	ABC
abc	abc
/ABC/i	ABC, abc, Abc
/ABC/	/ABC/

AppleScript for applications

Introduction

QuarkXPress can be scripted through AppleScript (a scripting language offered by Mac OS X). The Switch configurator for QuarkXPress allows executing a user-provided AppleScript script

to perform custom steps. Combined with Switch's built-in capabilities this provides powerful control of QuarkXPress.

Stages

The QuarkXPress configurator defines the action to be executed by its corresponding application in the form of three consecutive stages:

- Open the file and make it the currently active document.
- Perform a command on the currently active document.
- Save the currently active document and close it.

The desired action for each stage is defined independently, and can be selected from:

- One of the built-in actions listed by name.
- A user-provided script (which is specified by browsing to an AppleScript file).

Depending on the selected action a number of subordinate properties are shown to further configure the action. In other words, each choice has its own set of properties.

The properties for the "Use script" choice are described below; those for built-in choices are described with the QuarkXPress configurator.

Properties for specifying a user script

The following set of properties is shown for an action stage if the "Use script" option is selected for the stage.

Property	Description
Script file	The AppleScript to be executed for this stage; this can be a text file or a compiled script (see below)
Argument 1	The first argument to be passed to the script (or empty)
Argument 2	The second argument to be passed to the script (or empty)
Argument 3	The third argument to be passed to the script (or empty)
Argument 4	The fourth argument to be passed to the script (or empty)
Argument 5	The fifth argument to be passed to the script (or empty)

There are always five arguments because there is no mechanism to determine how many arguments are actually needed by the script.

More info needed?

For more information about scripting, refer to *the documentation on the Enfocus website*.

Writing an AppleScript for applications

Handler

The custom AppleScript must contain a run handler that takes a single argument, as follows:

```
on run {args}
 ...
end run
```

Arguments

When the configurator invokes the run handler, it passes a record to the single argument with useful information. The following table describes the fields in the record.

Field	Description
server	The name of the Switch Server hosting the configurator that executes this script(see referring to Switch below)
jobobject	An instance of the Job class (part of the Switch scripting API) representing the incoming job (see referring to Switch below)
infile	The absolute path (including name and extension) of the incoming QuarkXPress file (that is, the job itself of the main file inside the job folder), or the empty string if there is none This field is provided only to scripts attached to the "open" action
arg1	The first argument passed to the script (or the empty string if there is none)
arg2	The second argument passed to the script (or the empty string if there is none)
arg3	The third argument passed to the script (or the empty string if there is none)
arg4	The fourth argument passed to the script (or the empty string if there is none)
arg5	The fifth argument passed to the script (or the empty string if there is none)

Return value

The script's run handler must return a string value as described in the following table.

Action	Return value in case of success	Return value in case of error
Open	The string "/OK/"	Error message starting with "/ERROR/:"
Command	The string "/OK/"	Error message starting with "/ERROR/:"
Save as	Absolute path of output file or job folder (*)	Error message starting with "/ERROR/:"

(*) use the methods offered by the Job class (part of the Switch scripting API) to obtain a temporary output location.

Referring to Switch

If your custom script does not use any of the methods in the Switch scripting API then you may save it as a plain text file or as a compiled script (the latter is slightly more efficient).

However if your custom script does use any of the methods in the Switch scripting API then you need a special construct to ensure that AppleScript can access the Switch dictionary at compile-time, and that the commands are sent to the appropriate Switch Server at run-time:

- Use the following code for referring to the Switch Server from a tell statement:

```
using terms from application "PowerSwitch_Service"  tell application (server of args)    ...
 end tellend using terms from
```

- Save your script as a compiled script.

Examples of AppleScripts for applications

Open script: use document preferences

To open a document using document preferences, specify the following as a custom "open" script and enter "yes" for the first argument.

```
on run {args}
  set theJobPath to infile of args
  set theDocPrefs to arg1 of args
  set scriptResult to "/OK/"
  tell application "QuarkXPress"
    try
      if (theDocPrefs is equal to "yes") then
        open alias theJobPath use doc prefs yes remap fonts no do auto picture import
 no
      else
        open alias theJobPath use doc prefs no remap fonts no do auto picture import
 no
      end if
    on error errmsg number errnum
      set scriptResult to ("/ERROR/:" & errmsg)
    end try
  end tell
  return scriptResult
end run
```

Command script: reverse page order in a document

To reverse the page order in a document, specify the following as a custom "command" script. The script doesn't use any arguments.

```
on run {args}
  set scriptResult to "/OK/"
  tell application "QuarkXPress"
    try
      if not (exists document 1) then error "No open document"
      tell document 1
        set pageCnt to count of page
        if pageCnt is not equal to 1 then
          repeat with i from 1 to pageCnt
            move page pageCnt to before page i
          end repeat
        end if
      end tell
    on error errmsg number errnum
      set scriptResult to ("/ERROR/:" & errmsg)
    end try
  end tell
  return scriptResult
end run
```

Save as script: save as multi-file DCS

To save a document as multi-file DCS, specify the following as a custom "save as" script (using a compiled script). The script uses the first argument to specify the color setup ("Grayscale", "Composite RGB", "Composite CMYK", "Composite CMYK andSpot", "As Is").

```
on run {args}
  set theOutputSetup to arg1 of args
  set theResultJobPath to "/ERROR/:Unknown error"

  using terms from application "PowerSwitch_Service"
    tell application (server of args)
      try
        set theJob to jobobject of args
        set theJobProper to proper name of theJob
        set theResultJobPath to create path theJob name theJobProper with creating
 folder
      on error errmsg number errnum
        set theResultJobPath to ("/ERROR/:" & errmsg)
        return theResultJobPath
      end try
    end tell
  end using terms from

  tell application "QuarkXPress"
    try
      if not (exists document 1) then error "No open document"
      tell document 1
        set pageCnt to count of pages
        repeat with i from 1 to count of pages

          -- Create the sequential number for the file
          set fileNum to i
          repeat until (length of (fileNum as text)) = (length of (pageCnt as text))
            set fileNum to "0" & fileNum
          end repeat

          set FileName to theJobProper & "_" & fileNum & ".eps"
          set theResultPath to theResultJobPath & ":" & FileName

          save page i in theResultPath EPS format Multiple File DCS EPS data binary
 EPS scale 100 Output Setup theOutputSetup with transparent page
        end repeat
      end tell
      close document 1 without saving
```

```
    on error errmsg number errnum
      set theResultJobPath to ("/ERROR/:" & errmsg)
    end try
  end tell

  return theResultJobPath
end run
```

JavaScript for applications

Introduction

The Adobe Creative Suite applications (Acrobat, Photoshop, Illustrator and InDesign) can be extensively scripted through JavaScript (a scripting language interpreted and executed by the application). All four applications offer a similar overall interface for working with JavaScript, although each application offers a different set of JavaScript functions to actually control the application's functionality

The JavaScript programming interface for each application is documented in the application's software development toolkit which can be found on the Adobe web site. The Adobe Creative Suite bundle includes the "ExtendScript Toolkit" application which is extremely useful for developing and debugging JavaScript scripts for Adobe Creative Suite applications.

The Switch configurators for the four applications mentioned above allow posting a JavaScript script to the application for execution. Combined with Switch's built-in capabilities this provides powerful control of the Adobe Creative Suite applications.

Note: In the remainder of this topic "application" means one of the four Adobe Creative Suite applications mentioned above, and "configurator" means the Switch configurator that controls the application under consideration.

Stages

A configurator defines the action to be executed by its corresponding application in the form of three consecutive stages:

- Open the file and make it the currently active document.
- Perform a command on the currently active document.
- Save the currently active document and close it.

The desired action for each stage is defined independently, and can be selected from:

- One of the built-in actions listed by name.
- A user-provided script (which is specified by browsing to a JavaScript text file).

Depending on the selected action a number of subordinate properties are shown to further configure the action. In other words, each choice has its own set of properties.

The properties for the "Use script" choice are described below; those for built-in choices are described for each configurator separately.

Properties for specifying a user script

The following set of properties is shown for an action stage if the "Use script" option is selected for the stage.

Property	Description
Script file	The text file that contains the JavaScript script to be executed by the application for this stage
Argument 1	The first argument to be passed to the script (or empty)
Argument 2	The second argument to be passed to the script (or empty)
Argument 3	The third argument to be passed to the script (or empty)
Argument 4	The fourth argument to be passed to the script (or empty)
Argument 5	The fifth argument to be passed to the script (or empty)

There are always five arguments because there is no mechanism to determine how many arguments are actually needed by the script.

Writing a user script

To write a user script, simply provide the JavaScript statements that should be executed in the main body of the script file. If your script encounters an error, it should set the $error variable to the appropriate error message; otherwise it should leave the $error variable alone. See below for a typical coding pattern.

The following special global variables are defined before your script executes, and thus their value can be used in your script; in some cases (noted in the variable's description) your script should also set or update the contents of the variable.

Variable	Description
$arg1	The first argument passed to the script (or the empty string if there is none)
$arg2	The second argument passed to the script (or the empty string if there is none)
$arg3	The third argument passed to the script (or the empty string if there is none)
$arg4	The fourth argument passed to the script (or the empty string if there is none)
$arg5	The fifth argument passed to the script (or the empty string if there is none)
$infile	The absolute path of the input file, including name and extension; this is used mostly in a script attached to an "open" action
$doc	The currently active document, that is, the document that was opened by the "open" action; $doc is null for a script attached to an "open" action (or when the "open" action failed)

Variable	Description
	Note: • Use $doc instead of "this" to refer to the currently active document. • If you're using a custom 'open' script for the **InDesign or InDesign Server Configurator** to open or to create more than one document, the script must explicitly set the value for $doc. This is necessary to make sure the Configurator processes the right document. For other Adobe applications, the $doc variable is automatically set to contain the active document.
$outfolder	The absolute path of the folder in which to place the output; this is used mostly in a script attached to a "save" action
$filename	The filename (without extension) of the input (and output) file
$extension	The filename extension of the input file, or if it does not have one, the filename extension corresponding to the Mac file types of the input file
$outfiles	The incoming value of this variable is irrelevant If your script is attached to a "save" action, it should set the contents of this array variable to the absolute paths of the output files generated by the script
$jobfolder	The incoming value of this variable is irrelevant If your script is attached to a "save" action, it should set the contents of this variable as follows: • The empty string: each output file is moved along the outgoing connection as a separate job • The desired name of the job folder: all output files are placed inside a single job folder with the specified name
$error	If an error occurred during the execution of an earlier stage, or while preparing for the execution of this stage, this variable contains an appropriate error message: otherwise its value is null (NOT the empty string; an empty string signifies that an error indeed occurred but no meaningful error message was generated -- this is considered bad practice but it may happen) If your script encounters an error, it should set the $error variable to the appropriate error message (that is, a non-empty string); otherwise it should leave the $error variable alone. **Note:** If $error is set, the script will fail the job and move it to the 'Error' level data output connections. If there is no error connection, the job will be moved to the Problem jobs folder.

Variable	Description
	Note however that it's possible to explicitly determine where the job should go to (either to the Error connection or to the Problems jobs folder) by setting the *$status* variable. For more information, refer to the explanation below.
$status	$status allows you to control the output behavior of the error jobs, by specifying where the error out job must be moved to. You can also specify to stop the script from further processing in case of a critical failure. **Note:** The value of $status is ignored if $error is 'null'. Possible values: • **error** (default value): Failed jobs will be moved to the Error connection; if no Error connection is found, the jobs are moved to the Problems folder. • **failJob**: Failed jobs are sent to the Problems folder. • **failProcess**: In case of problems, all processing is stopped.

Error handling

Here's a typical coding pattern to correctly handle errors in a user script attached to the command action:

```
if ($error == null)
{
    try
    {
        // statements to be executed by this script
        // $doc.ApplicationDependentFunction();
    }
    catch( e )
    {
        $error = e.description;
        $status = failJob;
        // This will move the failed job to Problem Jobs folder. If not set, the
          default is the "Error" level data connection.
        $doc.closeDoc( Application Specific Parameters );
        // close any other resources used in the try block
    }
}
```

The InDesign and Illustrator configurator produce an XML log file. This is an example:

```
<AdobeConfiguratorLog>
 <FlowElementName>ConfiguratorFlowElementName</FlowElementName>
   <Job>
     <Name>NoFontPackage</Name>
     <Status>Error</Status>
     <StatusMessage>Error Message String</StatusMessage>
     <MissingFonts>
        <Font>Somora</Font>
        <Font>XBAND Rough</Font>
      </MissingFonts>
```

```
   <Job>
</AdobeConfiguratorLog>
```

Note: The log is an XML file named after the incoming job name.

Here's a typical coding pattern to correctly handle errors for Adobe Acrobat application:

```
// Acrobat is used to make a summary of the annotations resulting in a file that shows
 you the page
// content and the annotations per page.
// No arguments are required.

if($error == null)
{

 try
 {
  var title = $doc.documentFileName + " summary"
  $outfile = $outfolder + '/' + $filename + "_summary.pdf";
  $doc.ANsummarize($doc, title, ANSB_Page, null, $outfile, null, false, true, false,
 false, false, false);
  $outfiles.push($outfile);
 }
 catch(theError)
 {
  $error = theError;
  $doc.closeDoc( {bNoSave : true} );
 }
}

$error
```

More info needed?

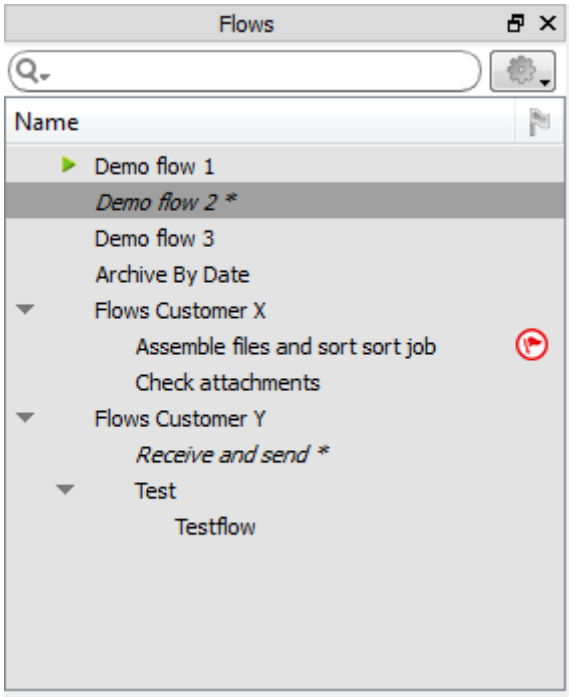
For more information about scripting, refer to *the documentation on the Enfocus website*.

5.2.5. Managing flows

5.2.5.1. Organizing flows

The Flows pane

The Flows pane lists all flows currently known to Switch. It allows organizing these flows in a hierarchy of groups and subgroups, and provides a context menu for managing flows in various ways.



Groups and subgroups

Groups and subgroups are marked with small icons, indicating whether or not the group is collapsed (so you don't see the flows) and/or the flows are activated.

Icon	Meaning
	This group is collapsed.
	This group is expanded.
	• If preceding a group: at least one of the flows of this group is activated. • If preceding a flow: this flow is activated.

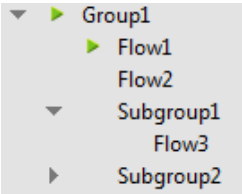
Example:

In the example below, one group with 2 subgroups has been defined.

Group1 and Subgroup1 are expanded; you can see the flows belonging to those groups.

Subgroup2 is collapsed.

Only Flow1 is activated.



Selecting flows

You can select any number of flows in the Flows pane at the same time.

Note: When you select *a group*, all flows and groups in that group are automatically selected as well, regardless of whether the group is displayed open or closed.

To select one or more flows:

1. To select one flow, in the Flows pane, click it.
   The selected flow is shown in the canvas.
2. To select more than one flow at a time, in the Flows pane, click the preferred flows while holding down the **Ctrl** or the **Shift** key.

   The selected flows do not have to be consecutive.

   All selected flows are shown as tiles in the canvas. Tiles cannot be edited. However, you can select a particular tile and edit its flow properties in the Properties pane. For more information, refer to *Multiple flows as tiles* on page 215.

Adding a group in the Flows pane

You can use groups to organize your flows into a tree-like structure, much like files in a folder tree. A group can contain flows and other groups, up to any nesting level.

To add a new group in the Flows pane:

1. In the Flows pane
   - To add a new group, select the flow after which the new group should be inserted.
   - To add a new subgroup, select the group in which the new group should be inserted.
2. Right-click and select **New group**.
3. In the Properties of the newly inserted group, click the **Name** field and type an appropriate name for the group.

The new group is empty. You can move existing flows to the group (see *Organizing flows* on page 262) or create new flows for that group.

Reorganizing flows in the Flows pane

You can reorganize the order and nesting structure in the Flows pane by dragging the flows around.

Note: You can move flows as well as groups; when moving groups, all flows belonging to that group are moved to the new location.

To move flows to a different location in the Flows pane

1. Select the flow(s) you want to move.

   To select multiple flows, hold down the **Ctrl** key while selecting the flows.

2. Drag the selected flows to the target location. You can:
   - Drop them in between two flows to move them between those flows, or
   - Drop them on top of a group to place them inside that group. This works, even if the group is collapsed.

Ordering flows in the Flows pane

The Flows pane supports three row ordering modes, i.e. three ways to sort the flows:

- **Manual ordering**: The flows are ordered by manually dragging them into the appropriate position.
- **Sorted by name**: At each level in the tree, flows are sorted on the name column (case insensitive, and regardless of whether they are groups or flows).
- **Sorted by marker**: At each level in the tree, flows are sorted on the marker column (see *Setting flow markers* on page 265), and then on the name column (so that the order is predictable when rows have the same marker).

To change the sort order in the Flows pane

1. Do one of the following
   - To order the flows manually, drag them into the appropriate position.
   - To sort by name, click the column header of the Name column.
   - To sort by marker, click the column header of the Marker column (small flag icon).

   Note: If the Marker column is not visible, right-click the column header of the Name column and select **Marker column**.

2. To toggle between ascending and descending order, click the column header (of the column you're sorting by).

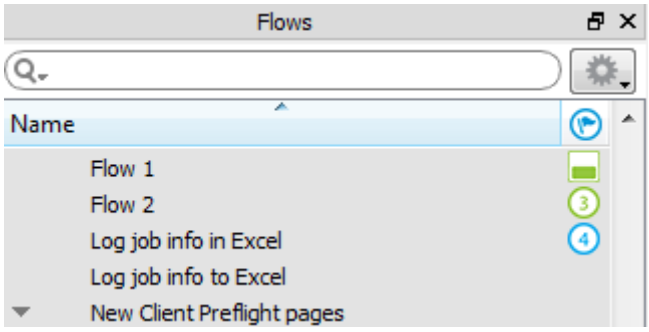
Setting flow markers

The rightmost column in the Flows pane can display a marker icon selected from a pre-defined list of icons (including colored flags, priorities, and level of completeness indicators).

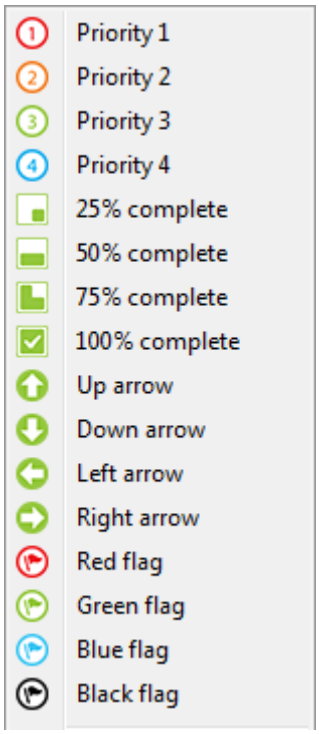
The markers have no meaning to Switch. They can be useful to sort flows, for example by priority or by level of completion.

Flow markers are preserved when exporting and importing flows.

Example Flows pane with markers



Available icons



Custom image

You can also upload your own custom image and use it as a flow marker.

Groups

Groups only have a marker if all flows belonging to that group have the same marker. For example, if all flows in a group are marked as Priority 1, the group will be marked as Priority 1 as well.

In all other cases (if none of the flows have a marker, or they have different markers), no marker is displayed at group level.

Setting a marker for a flow

To set the marker for one or more flows

1. Select the flows you want to mark (with one particular marker).
2. Right-click and select **Mark flow**.
3. Select the appropriate marker or upload a custom image.
   The selected marker icon is displayed next to the flow, in the Marker column. In the properties of the flow, the Marker image property holds the name of the marker (e.g. Priority 4) or the name (and path) of the custom image (e.g. /Users/<userX>/my_image.png).

Note: If the Marker column is not visible, right-click the column header of the Name column and select **Marker column**.

Clearing a marker for a flow

To clear the marker for one or more flows

1. Select the flow(s) for which you want to clear the marker.
2. Right-click to open the context menu.
3. Select **Mark flow**.
4. Select **No marker**.
   The marker is removed from the Flows pane. In the flow properties, the Marker image property is set to None.

5.2.5.2. Changing flow properties

After you have created a flow, you can still make a number of changes. You can for example:

- Rename the flow.
- Add a background and/or a header image.
- Tune the performance of Switch, by overruling a number of default settings for concurrent job processing (Refer to **Allowing advanced performance tuning** in *Flow properties* on page 268).

To change the flow properties

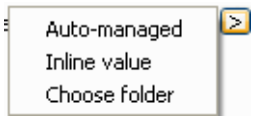
1. In the Flows pane, select the flow of which you want to change the properties.

   Note: Make sure that none of the flow elements in the canvas are selected. Otherwise, you might see the properties of the element, rather than the properties of the flow.

   The properties of the selected flow are displayed in the Properties pane.

2. Click the property you want to change.
   Depending on the selected property, a text box, a button, or a drop-down menu appears.
3. Make the required changes:

If ... appears	Do the following:
A text box	Type the text in the displayed text field.
A drop-down menu	Select the appropriate option.
...	1. In the the property editor dialog that pops up, update the field(s) as required. 2. Click **OK**.
>	1. From the pop-up list, select one of the options.

If ... appears	Do the following:
	 Depending on the selected option, an inline editor or a dialog appears. 2. Configure the desired values.

For an overview of the properties and their meaning, see *Flow properties* on page 268.

Your changes are applied immediately.

Flow properties

The following properties are displayed in the Properties pane, when you select a particular flow.

Property	Description
Name	The name of the flow as it is shown in the Flows pane.
Description	A description of, or comments about the flow; the text in this field may have multiple lines. The creation date and time are filled in automatically (but can be removed as required).
Background image	A PNG or JPG image to be shown in the background of the flow design. • The background image is placed at its effective resolution. • If the image is too small to fill the canvas, it is repeated (as tiles). • When the flow is not editable (because it is locked or active), the background image is darkened. The background image is a kind of wallpaper on which the flow design is drawn. Light colors or sober patterns work best.
Header image	A PNG or JPG image to be shown in the upper-left corner of the flow design, on top of the background image. • The header image is placed at its effective resolution. • The header image is not repeated to fill the canvas. • When the flow is not editable, the header image is not darkened. The header image is intended to mark a flow with a company or brand logo. Small images work best (avoiding overlap with the actual flow design).
Marker image	If a flow marker is set: the name of the marker (e.g. Priority 4) or the name (+path) of the uploaded custom image (e.g. /Users/<userX>/my_image.png). If no flow marker is set: the value is **None**.

Property	Description
Allow advanced performance tuning	Performance settings are configured in the Switch Preferences (*Switch preferences: Processing* on page 41). They apply to all flows and all flow elements. However, to improve the performance of a particular flow, you can overrule two default settings by enabling the **Allowing advanced performance tuning** option in the properties of that flow. As a result, all flow elements (used in that particular flow) that can process jobs concurrently, will have two additional properties that can be changed: • **Number of slots** : Number of slots available for concurrent processes. • **Idle after job (secs)** : Idle time-out after each job.
Time-of-day window	If set to **Yes**, the flow will be active during a particular time of the day, as specified in the following properties (only available if *Time-of-day window* is enabled): • *Allow from (hh:mm):* Start time, for example: 09:00 • *Allow to (hh:mm):* End time, for example: 11:00
Day-of-week window	If set to **Yes**, the flow will be active during a couple of days of the week, as specified in the following properties (only available if *Day-of-week window* is enabled): • *Allow from*: Day of the week the flow will be activated, for example: Tuesday • *Allow to*: Day of the week the flow will deactivated, for example: Friday
Day-of-month window	If set to **Yes**, the flow will be active during a particular day of the month, as specified in the following properties (only available if *Day-of-month window* is enabled): • *Day*: Day of the month during which to keep the flow active. Use a number between 1 and 31. For example, "1" (default) means the first or the last day of the month (depending on the value in *Relative to*). • *Relative to*: Choose between: Start/end of the month.

Note: If you have enabled the Time-of-day, Day-of-week or Day-of-month window, when activating the flow manually, it will be preceded by a small icon . This indicates that the flow is scheduled and will be active during the time specified in the Flow properties.

5.2.5.3. Adding and removing flows

The Flows pane lists all flows known to Switch at the present time.

Adding flows

-

See *Creating flows*
-

See *Importing a flow or a flow group* on page 276

Duplicating flows

To make a copy of one or more existing flows

1. Select the flow(s) in the Flows pane.
2. Do one of the following: menu item, or
   - Select **Flow** > **Duplicate Flow(s)**.
   - Right-click and select **Duplicate Flow(s)**.
   - Drag the selected flow(s) to a different location in the Flows pane.

     You must hold down the appropriate modifier key to select and move multiple flows.

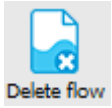
The suffix "[Copy]" is added to the names of the duplicated flows.

Note: You can duplicate a flow even while it is active; the new copy will be inactive.

Deleting flows

To delete one or more flows

1. In the Flows pane, select the flow(s) you want to delete.

   Make sure the flows are inactive, as it is not possible to delete an active flow.
2. Do one of the following:
   - In the toolbar, click the **Delete Flow** button 

.
   - From the menu, select **Flow** > **Delete Flow**.
   - In the Flows pane, click and select **Delete Flow**.
   - Press the **Delete** key.
3. Confirm your choice.

Remember that deleting a flow is permanent and cannot be undone.

5.2.5.4. Saving and reverting flows

As long as a flow hasn't been saved, in the Flows pane, its name is displayed in italics and followed by an asterisk. The unsaved changes are stored in the local cache on disk on the Designer side.

Note: You can have several flows with unsaved changes in your design. It is also possible to switch between flows without saving. However, if you want to exit the application, or if you want to activate a flow, you will be asked to save your changes.

Saving flows

Before you can activate one or more flows, you must first save them. In the Flows pane, unsaved flows are displayed in italics, followed by an asterisk.

Note: If you forget to save your flow, a warning pops up. Note that clicking **Save**, will save **all** flows with unsaved changes. If you do not want to save all unsaved flows, click **Cancel** and manually save the flows as required.

To save flows

1. In the Flows pane, select the flow(s) you want to save.
2. Do one of the following:
   - In the toolbar at the top of the screen, click

   - In the Flows pane, right-click and select **Save Flow(s)**.
   - From the menu, select **Flow** > **Save Flow(s)**.

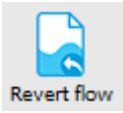
   In the Flows pane, the flow names are no longer displayed in italics and the asterisk has disappeared. You can now activate the flow(s) as required.

Reverting flows

As long as a flow hasn't been saved, you can go back to the previously saved version. You can do this for one flow at a time, or for several flows at the same time.

To revert flows

1. In the Flows pane, select the unsaved flow(s) you want to revert.

   Flows with unsaved changes are displayed in italics and followed by an asterisk.
2. Do one of the following:
   - In the toolbar at the top of the screen, click 

- In the Flows pane, right-click and select **Revert Flow(s)**.
- From the menu, select **Flow** > **Revert Flow(s)**.

A warning appears.

3. Click **Yes** to confirm.
   In the Flows pane, the flow names are no longer displayed in italics and the asterisk has disappeared. You can now activate the flow(s) as required.

5.2.5.5. Locking and unlocking flows

A flow in the Flows pane can be locked for editing.

When a flow is locked, the Flows pane shows the state icon when the flow is inactive and no changes can be made to the flow design or to the flow's properties. The flow can still be activated as usual. The icon is not visible when you activate the flow but the flow remains locked.

The locking status is preserved when the flow is exported and re-imported.

Locking flows without password

When a flow is locked without a password, it can be unlocked without providing a password (i.e. no password is requested). This is useful to guard against accidental editing without protection against interference by another user.

To lock one or more flows without password

1. In the Flows pane, select the flows you want to lock.
2. Do one of the following:
   - From the menu, select **Flow** > **Lock**.
   - In the Flows pane, right-click the selected flow(s) and choose **Lock**.
   - In the Flows pane, click and select **Lock**.

   Switch displays a dialog requesting a lock password.
3. Leave the password blank.
4. Click **OK**.

Locking flows with a password

When a flow is locked with a password, the password must be provided to unlock it. The password is stored in the flow definition in an encrypted form.

Note: There is no way to recover the password when forgotten!

To lock one or more flows with a password

1. In the Flows pane, select the flow(s) you want to lock.

2. Do one of the following:
   - From the menu, select **Flow** > **Lock**.
   - In the Flows pane, right-click the selected flow(s) and choose **Lock**.
   - In the Flows pane, click and select **Lock**.

   Switch displays a dialog requesting a lock password.
3. Enter the same password twice.
4. Click **OK**.

Note: Certain Enfocus employees have access to a mechanism that bypasses the password protection (because Switch defines the password encryption). While Enfocus does not intend to open password-protected flows, and does not intend to publish the bypass mechanism, the company does not legally guarantee that this will never happen. It is important for flow designers to understand the limitations of the protection.

Unlocking flows

To unlock one or more flows

1. In the Flows pane, select the flow(s) you want to unlock.
2. Do one of the following:
   - From the menu, select **Flow** > **Unlock**.
   - In the Flows pane, right-click the selected flow(s) and choose **Unlock**.
   - In the Flows pane, click and select **Unlock**.

   If the flow is password protected, Switch displays a dialog requesting the password. Otherwise, the flow is unlocked immediately.
3. Enter the password.
4. Click **OK**.

5.2.5.6. Activating and deactivating flows

A flow can be in different states:

- An **inactive** flow is in "design mode": you can change the flow and the flow element properties. An inactive flow cannot process jobs.
- An **active** flow is currently being executed by the Switch Server, that is, it is processing jobs.

  An active flow cannot be edited. This state is indicated by the icon next to the flow name in the Flows pane, and by the darkened background in the canvas.

For an overview, refer to *Flows pane* on page 81 (Table "State").

Activating flows

If you want a flow to start processing jobs, you must activate it. Note that you can activate several flows in one go.

To activate flows

1. In the Flows pane, select the (inactive) flow(s) you want to start.
2. Do one of the following:
   - In the toolbar at the top of the screen, click Activate flow.
   - In the Flows pane, click and select **Activate Flow(s)**.
   - In the Flows pane, right-click and select **Activate Flow(s)**.
   - In the Flows pane, double-click the selected flow (only possible in case of a single flow).
   - From the menu, select **Flow** > **Activate Flow(s)**.

   If you haven't saved your flow yet and you haven't enabled automatic flow saving in the *user interface preferences*, a warning pops up. Note that clicking **Save**, will save all flows with unsaved changes. If you do not want to save all unsaved flows, click **Cancel** and manually save the flows as required.

   The background of the flow is darkened. In the Flows pane, you can see an icon next to the name of the flow. The flow is now active and waits for input jobs to appear.

   Note: If the flow has been scheduled, an icon appears. The flow will become active at the time specified in the Flow properties (See *Flow properties* on page 268).

Deactivating flows

If you want a flow to stop processing jobs, you must deactivate it. Note that you can deactivate several flows in one go.

To deactivate flows

1. In the Flows pane, select the (active) flow(s) you want to stop.

   To select multiple flows, hold down the **Ctrl** or **Shift** key while selecting.
2. Do one of the following:
   - In the toolbar at the top of the screen, click Stop flow.
   - In the Flows pane, click and select **Stop Flow(s)**.
   - In the Flows pane, right-click and select **Stop Flow(s)**.
   - From the application menu, select **Flow** > **Stop Flow(s)**.

The processing is terminated. You can now edit the flow as required.

5.2.5.7. Importing and exporting flows

If you want to make a backup of your flows, or if you want to share them with someone else, you can export the flows concerned. Likewise if you have an exported flow, you can import that flow into your copy of Switch and have the flow appear in the Flows pane.

You can do this for single flows, but you can also import and export flow *groups* as a whole (to maintain the hierarchy and the order of the flows).

Exported flows are saved as files with the "sflow" filename extension; exported flow groups have the "sflow**s**" filename extension.

Note: Flows cannot be exported to or imported from folders that are shared such as the **Desktop** folder and the **Downloads** folder. This is also the case for folders that are redirected from shared folders.

References to external files

If a flow which contains a link to an external file (for example an XSLT stylesheet) is exported, both the *location* of this file and the *file itself* are stored inside the flow file.

When the flow is imported again, Switch will search for this file in the same location. However, if the external file is not available (e.g. because the flow is imported on another system, which doesn't have this file), Switch will use the file that is stored in the flow and link the value of the property to that file.

Tip: To make sure flows are kept in sync on different computers, we recommend copying all external files to all systems. This way, you don't have to worry about files stored in the internal Switch structure.

For more details, refer to *Compatibility considerations* on page 277.

Exporting a flow or a flow group

To export one or more flow or flow groups

1. In the Flows pane, select the flow(s) or flow group(s) concerned.
2. Do one of the following:
   - From the menu, select **Flow** > **Export Flow(s)...**
   - Right-click the selected flow(s) and choose **Export Flow(s)...**
   - Click and select **Export Flow(s)...**
3. Choose a location and a name (in case of a single flow) or a destination folder (in case of flow groups or if you selected more than one flow).
   The selected flows and flow groups are exported and saved in the chosen location. If you have exported several flows, the flows are saved in the destination folder, one file per flow, and they are named after the flow. For example, a flow called DemoFlow will result in a file called *DemoFlow.sflow*.

Flow groups are saved with file extension "sflow**s**", for example *CustomerXflows.sflows*.

Exporting all flows in the Flows pane (for a backup)

Use this function if you want to create a quick backup of your flows, being sure that all flows are exported.

To export all flows in the Flows pane

1. Do one of the following:
   - From the menu, select **Flow** > **Export all...**.
   - In the Flows pane, click and select **Export all...**.
2. Select a destination folder.
   The flows are exported and saved in the chosen location. The grouping structure of the flows in the Flows pane is not exported. There is no way to do this.

Importing a flow or a flow group

To import one or more flows from an external ".sflow" file (in case of single flows) or ".sflow**s**" file (in case of flow groups)

1. Determine where you want your flow(s) or flow group(s) to be placed in the Flows pane.

   The flow(s) /flow group(s) will be placed at the same level as the flow that is have currently selected. If no flows are selected, they will be placed at the root level (highest level).
2. Do one of the following:
   - From the menu, click **Flow** > **Import Flow...**.
   - In the Flows pane, right-click somewhere and choose **Import Flow...**.
   - In the Flows pane, click and select **Import Flow...**.
3. Select the external file(s) you want to import.

   You can select multiple files at the same time by holding down the **Ctrl** or **Shift** key.
4. Click **Open**.

   If problems occur, a message will appear, for example to warn you about unsupported flow elements (See *Importing a flow with unsupported flow elements* on page 277).

   If everything goes well, the flow(s) or flow group(s) will appear in the Flows pane. The hierarchy and the order of the flows in the the flow groups are preserved.

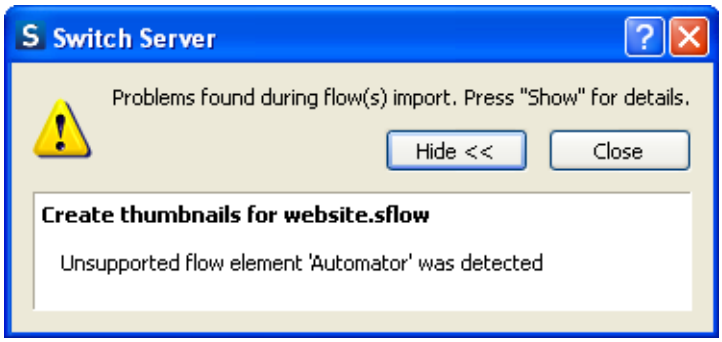
Alternative ways to import files:

Alternatively you can locate the external ".sflow(**s**)" file using the Windows Explorer (on Microsoft Windows) or Finder (on Mac) and:

- Double-click the file; this will launch Switch if it is not yet running and import the flow or flow group.
- Drag and drop the file onto the Flows pane in Switch; this will import the flow or flow group.

Importing a flow with unsupported flow elements

When you import a flow in which some of the flow elements are not supported by the current configuration of Switch (for example, the flow element may belong to a module which you have not licensed), the following message will be displayed:



When you click **Close** in the above dialog box, the flow is imported along with the unsupported flow elements, but the unsupported flow elements will display a small triangle with an exclamation mark. When you hover your mouse over this triangle, a pop-up also displays the message about the unsupported flow element.

Compatibility considerations

When exporting a flow, Switch stores a maximum amount of information in the exported flow file:

- The list of flow elements and connections as they are shown in the canvas, including the geometry.
- The values of all properties, including references to backing folders and configuration files
- A copy of any referenced configuration files.

Sometimes a property value refers by name to configuration data stored internally by a third-party application. In those cases it is not possible to include the configuration data itself (the reference by name is still included).

When importing a flow, Switch ensures that all encountered flow elements and properties are supported by this version of Switch. If not, any issues are reported to the user and the unsupported items are omitted from the imported flow. Switch also copies configuration files from the flow file being imported into a special location under its application data root, and changes the corresponding references to point to these new copies.

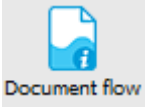
Further validation of property values is performed when the flow is activated (for example, ensuring that all backing folders have a valid path).

Auto-managed backing folders are automatically created where necessary. For user-managed backing folders the original paths are preserved without change. In most cases this means that you must create and assign new backing folders (i.e. unless the backing folders already exist because you are importing a flow that was previously created on your own system).

5.2.5.8. Generating flow documentation

For a good overview of a flow and its flow elements, it may be handy to generate an HTML page that contains all this information. You can afterwards save this HTML as PDF (using the print function of your browser) as required.

To generate flow documentation

1. In the Flows pane, select the flow for which you want to generate the documentation.
2. Do one of the following:
   - In the toolbar at the top of the screen, click 

   - In the Flows pane, right-click and select **Document Flow**.
   - From the menu, select **Flow** > **Document Flow**.

The flow documentation is generated and shown immediately in your default browser. It provides you with details of the flow itself (e.g. name and description, if a background image is used, ...), a graphical representation of the flow (as shown on the canvas), and an overview of all properties of all flow elements. Note that you can click the elements in the flow image, to see the corresponding properties. The arrow allows you to return to the top of the HTML page.

5.2.6. Monitoring flows

5.2.6.1. Viewing an active flow

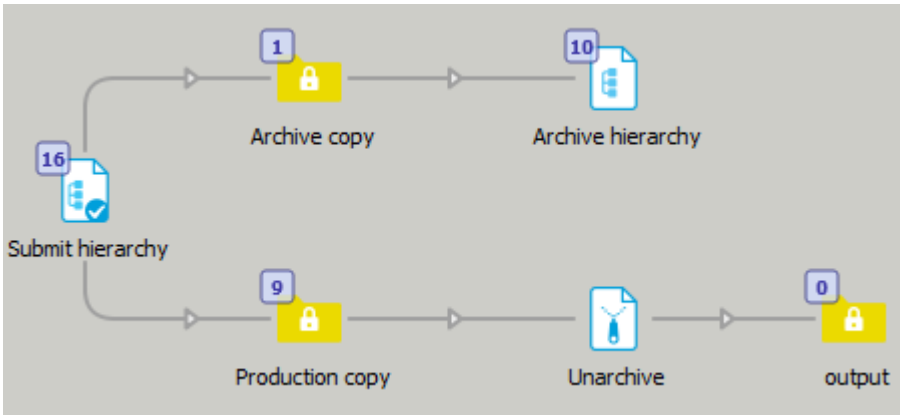
Active flows are flows which have jobs that are currently being processed by the Switch Server. The active state is indicated by the icon next to the flow name in the Flows pane, and by the darkened background in the canvas. See *Activating and deactivating flows* on page 273 and *Flows pane* on page 81.

While executing a flow the canvas provides visual feedback about the number of jobs residing in each backing folder, and about problem jobs and problem processes, as described in this topic below.

More extensive feedback about flow execution is provided elsewhere; for more information see:

- *Viewing log messages* on page 284
- *Viewing processes in the Progress pane* on page 288
- *Viewing flow problems in the Dashboard pane* on page 289

Number of jobs



When a flow is active, the canvas attaches a small rectangle to each flow element that has a backing folder, as shown above. The number in the rectangle reflects the number of jobs residing in the flow element's backing folder.

For performance reasons Switch stops counting at 100 jobs. When a backing folder contains 100 or more jobs, the rectangle displays the symbol for infinity.

Scanning user-managed folders and checking Mail / FTP

Switch automatically scans the contents of user-managed folders and checks Mail and FTP in an active flow at regular intervals. The interval between scans is governed by global user preferences; see *Switch preferences: Processing* on page 41.

When testing a flow it is sometimes impractical to wait for the next interval scan. Therefore, when a flow is active, you can use an option in the context menu to immediately scan the folders concerned:

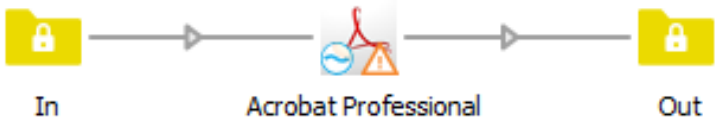
- The **Scan now** context menu for Folder and Submit hierarchy elements causes Switch to immediately scan the corresponding folder.
- The **Check now** context menu for Mail Receive and FTP receive causes Switch to immediately check for jobs arrived by mail or FTP .
- The **Scan folders now** context menu for the canvas causes Switch to immediately scan all backing folders in the currently displayed flow.
- The **Check FTP now** context menu for the canvas causes Switch to immediately check for arrived jobs with all FTP receive flow elements in this flow.
- The **Check Mail now** context menu for the canvas causes Switch to immediately check for arrived jobs with all Mail receive flow elements in this flow.

Problem jobs

When the Problem jobs flow element contains at least one problem job, it displays a red error mark as shown above. This feedback is provided for both active and inactive flows.

See also *Handling problem jobs* on page 293.

Problem processes



When a flow is active, flow elements that correspond to a problem process display a red error mark (as shown above for FTP send). This feedback is provided only for active flows since, by definition, an inactive flow can't have problem processes.

See also *Handling problem processes* on page 294.

5.2.6.2. Putting connections on hold

Most connections offer a **Hold jobs** property. If this property is enabled, jobs are not allowed to move through the connection. This is mostly used to temporarily hold jobs (for example because there is a problem with a process downstream).

The canvas displays connections on hold as an orange dashed line.

Although editing in the Properties pane is disabled while a flow is active (see *Activating and deactivating flows* on page 273), the status of the Hold jobs property can be modified at any time through the context menu of the connection.

Putting a connection on hold

Sometimes it's useful to temporarily hold jobs, i.e. stop them from moving through the connection, for example because there is a problem with a process downstream.

To put a connection on hold

1. Select the connection in the canvas.
2. Do one of the following
   - Right-click the connection and select **Hold**.

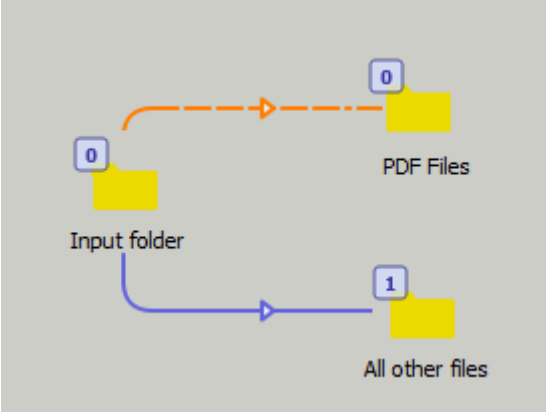
     Note: This works, even if the flow is active.
   - In the Properties pane, set the value of the **Hold jobs** property to **Yes**.

     Note: This does not work if the flow is active.

   In some cases, a (partial) hold is not possible, for example because jobs are moved under an external application's control. In other cases, if setting *one* connection on hold, all other connections originating from the same tool are automatically set on hold as well.

For more information, refer to *Examples of connections on hold* on page 282.

Once put on hold, the connection is displayed in the canvas as an orange dashed line.



Note: If a job is being processed over the connection when the transition occurs, that job/process will be allowed to complete normally. In that case a job will arrive in the connection's destination after the connection has been put on hold.

Releasing a connection

If a connection is set on hold, no jobs can move through the connection, until the connection is released. The connection is displayed in the canvas as an orange dashed line.

To release a connection

1. Select a connection in the canvas.
2. Do one of the following
   - Right-click the connection and select **Release**.

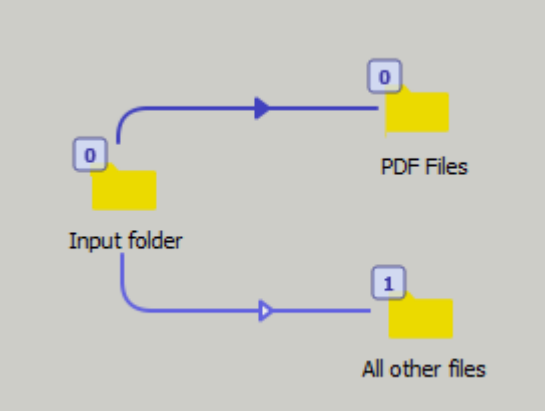
     Note: This always works, even if the flow is active.
   - In the Properties pane, set the value of the **Hold jobs** property to **No**.

     Note: This does not work if the flow is active.

   In some cases, if releasing *one* connection on hold, all other connections originating from the same tool are automatically released as well.

   For more information, refer to *Examples of connections on hold* on page 282.

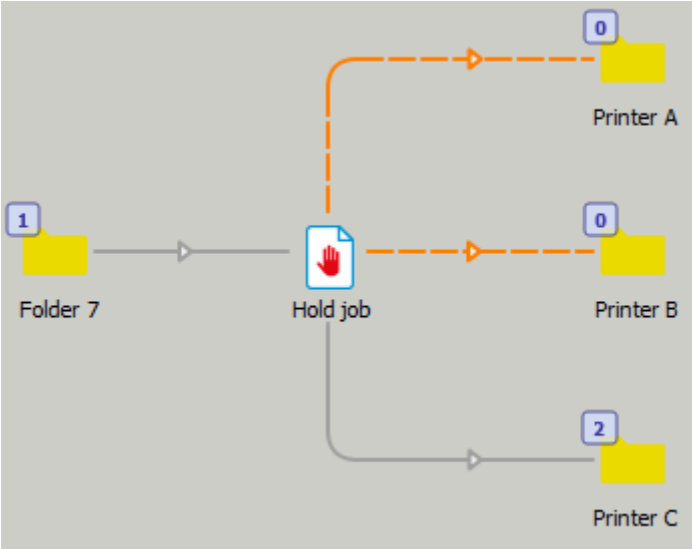
   The connection is displayed in the canvas as a continuous line. The color depends on the color set in the Color property of the connection (blue in the image below). The default color is gray.



Note: As of Switch 2018, it is possible to release all connections in one go, using the **Release all** option in the context menu of the canvas.

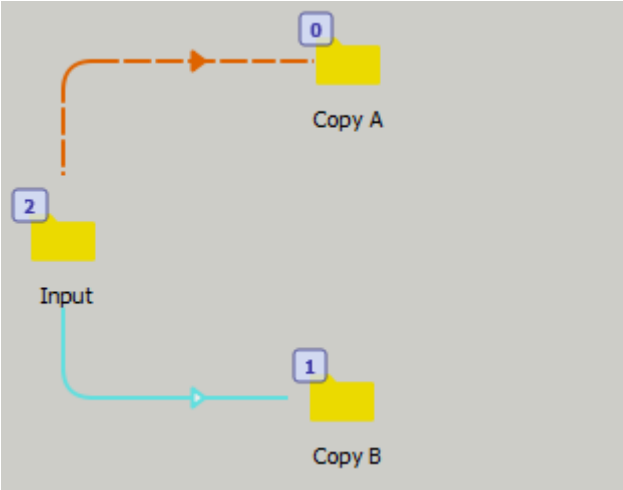
Examples of connections on hold

Hold job example



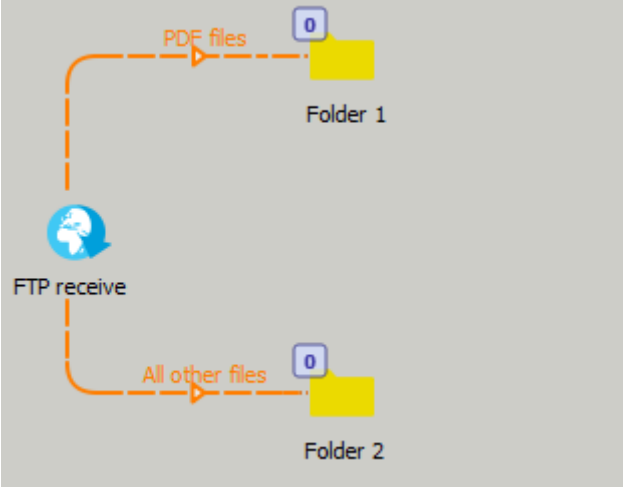
In this example, the **Hold job** flow element is used to distribute jobs evenly across three printers. The connections for printers A and B have been put on hold because the printers are temporarily off line. This causes the Hold job to send all jobs to printer C.

Folders example



In this example, the connections are set up to duplicate the incoming job (one copy in each output folder). When the first connection is put on hold, the copies for that connection are held in the input folder until the connection is released. The copies for the other connection proceed without interruption.

FTP receive example

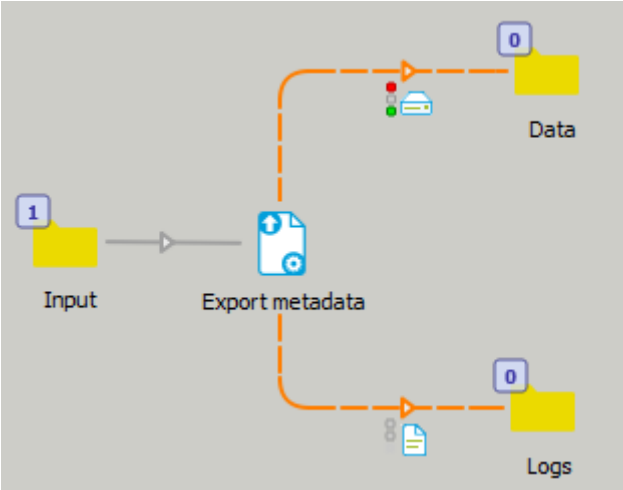


In this example, file filters have been set up for the connections leading from the FTP receive tool. PDF files are sent to Folder 1 and all other jobs are sent to Folder 2.

When the **PDF files** connection is put on hold, **the other connection is automatically put on hold as well**, effectively disabling the FTP receive tool. The connections are linked in this respect because implementing a "partial hold" on the remote connection would be tricky.

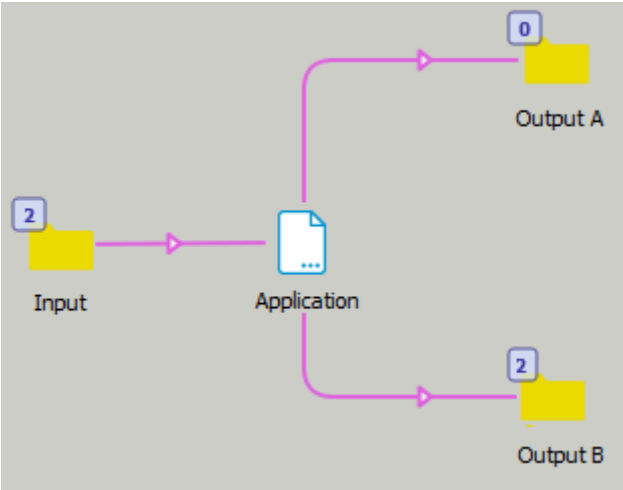
Once the connections are on hold, maintenance can happen on the FTP server without affecting the rest of the flow.

Traffic-light example



Traffic light connections carry data or log information for the same job, so it does not make sense to put a single connection on hold independently. **When one of the connections is put on hold, all other connections are automatically put on hold as well**, effectively disabling the originating tool.

Generic application example



In this example, the **Generic application** tool is used to integrate an external hotfolder application in the flow. **The connections can't be put on hold** because the jobs are moved under the external application's control.

5.2.6.3. Viewing log messages

This topics describes how you can open the log messages overview in Switch. Alternatively, the message overview can be opened through the Switch Web Portal. See also *Viewing log messages through the Switch Web Portal* on page 309.

To view the log messages

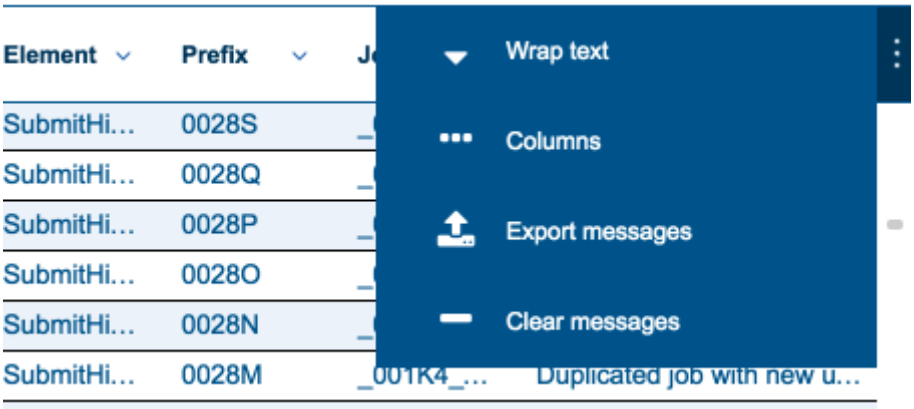
1. In Switch, do one of the following:
   - Click **View** > **Messages**.
   - Press **F6**.
   - Click the **Messages** button in the Switch toolbar.

   The most recent log messages are displayed in your default web browser, with a maximum of 1000 messages in total. If the autorefresh option is turned on (at the bottom of the screen), the list is automatically renewed. By default, the list is sorted chronologically, most recent messages at the top.

   Remark:

   - If the message text is too long to be displayed, you can turn on the **Wrap text** option.
   - If you don't want to see all columns, you can hide some of them using the **Columns** option.

   Both options are available in the menu that appears when you click the button on the right (see screenshot).



2. The first time you open this view, you'll see a banner stating that cookies are used to enhance the user experience. Click **Accept** to allow Switch to save your preferences.
   If you accept cookies, your preferences are saved when closing your browser, so you don't have to set them next time you log in. If you click **Do not use cookies**, you can continue to work, but you will have to select your language again every time you log in in a new browser.

You can now sort the messages, filter out the messages you're not interested in, or export messages. Refer to *Filtering log messages* on page 285, *Sorting log messages* on page 287 and *Exporting log messages* on page 287.

Filtering log messages

To filter the log messages

1. Click the header of the column you want to use to filter the messages.
2. In the menu that appears, click the filter icon.

3. Set your filter as required:

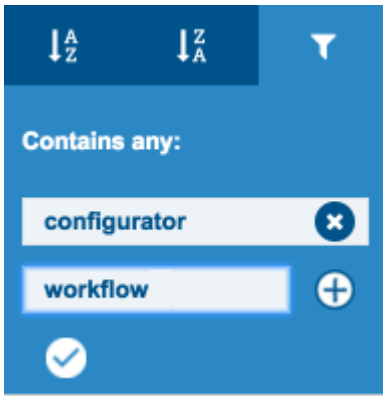
   There are some small differences depending on the chosen column.

   - In the **Time** column, select the filter of your choice from the list and configure it as required. For example, to only view the latest messages, select **After** and click the date and time of your choice. Other filter options are:
     - Messages issued in the last x number of hours or days
     - Messages issued before or after a particular date and time, or between two dates (with a precision of 5 minutes)
   - In the **Type** column, select the checkbox of the messages type(s) you want to view in the list, for example Error and Warning. See also *The Messages overview* on page 310.
   - In the other columns, enter one or more strings to only view the entries that contain those strings. The case of the entered strings is not taken into account.

     Note:

     - To view messages that contain several strings in one entry (e.g. configurator AND workflow), type those strings in one filter field.
     - To view messages that contain either string x or string y (e.g. configurator OR workflow), type those strings in two different filter fields (see screenshot).

       Extra filter fields are added by clicking and removed by clicking the cross button.



4. Click to confirm.
   The filter is applied immediately. The strings used to filter the messages are displayed above the columns in blue labels.

5. To clear a filter, click the cross icon in the blue label.
   The label is removed and the messages overview is updated immediately.

Remark for Web Portal users only

You can save your message filters by clicking the **+ Save current filter** button in the blue navigation area.

Sorting log messages

To sort the log messages

1. Click the header of the column you want to use to sort the messages.

   The Messages overview can be sorted by the values in all columns except for the Messages column.

2. Choose the preferred sort order:

To sort	Click
Ascending, from old to new (Time column)	
Descending, from new to old - this is the default sort order (Time column)	
Ascending, from A to Z (all other columns, except for Messages)	
Descending from Z to A (all other columns, except for Messages)	

   The new sort order is applied immediately and indicated in the white space above the messages (in a blue label), e.g. "sort Module DESC" means that the messages are sorted by the items in the Module column, in descending order.

Exporting log messages

Log messages can be exported to a CSV file for processing by third-party tools. If you have set filters, these filters are taken into account; only the messages that are shown will be exported to a file.

Note: As of Switch 2017 it is no longer possible to export log messages to an XML file.

To export log messages

1. Open the Log messages overview.

2. Do one of the following:

   - Click the icon in the top right corner and click **Export messages**.
   - Right-click in the overview and click **Export messages**.

   A log.csv file is created.

Clearing log messages

Log messages are stored in a database on disk and thus remain available after quitting and restarting Switch. The application data preferences determine for how long messages are retained.

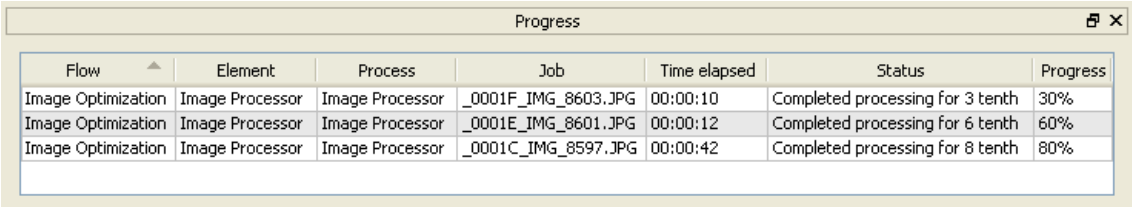
To permanently clear all log messages

1. Open the Log messages overview.
2. Do one of the following:
   - Click the icon in the top right corner of the overview and click **Clear messages**.
   - Right-click in the overview and click **Clear messages**.

A confirmation dialog appears. If you click **Yes**, all messages will be removed from the log database. **Note that there is no undo for this action!**

5.2.6.4. Viewing processes in the Progress pane

The Progress pane displays a list of currently executing processes (for all active flows) with their progress information.



Progress

Flow	Element	Process	Job	Time elapsed	Status	Progress
Image Optimization	Image Processor	Image Processor	_0001F_IMG_8603.JPG	00:00:10	Completed processing for 3 tenth	30%
Image Optimization	Image Processor	Image Processor	_0001E_IMG_8601.JPG	00:00:12	Completed processing for 6 tenth	60%
Image Optimization	Image Processor	Image Processor	_0001C_IMG_8597.JPG	00:00:42	Completed processing for 8 tenth	80%

Examples of processes include internal processes such as downloading a file from an FTP site, and external processes controlled by Switch such as distilling a PostScript file. Processes are dynamically added to and removed from the list as they occur.

Concurrent processes

Depending on the value of the processing preferences, there may be more or less concurrent processes.

Stopping and starting processing

- To cause the Switch Server to stop processing, choose **File** > **Stop processing**.
- To resume processing, choose **File** > **Start processing**.

When you stop processing, operation of all active flows is halted and flows are de-activated temporarily. When you subsequently start processing, all active flows are simply resumed.

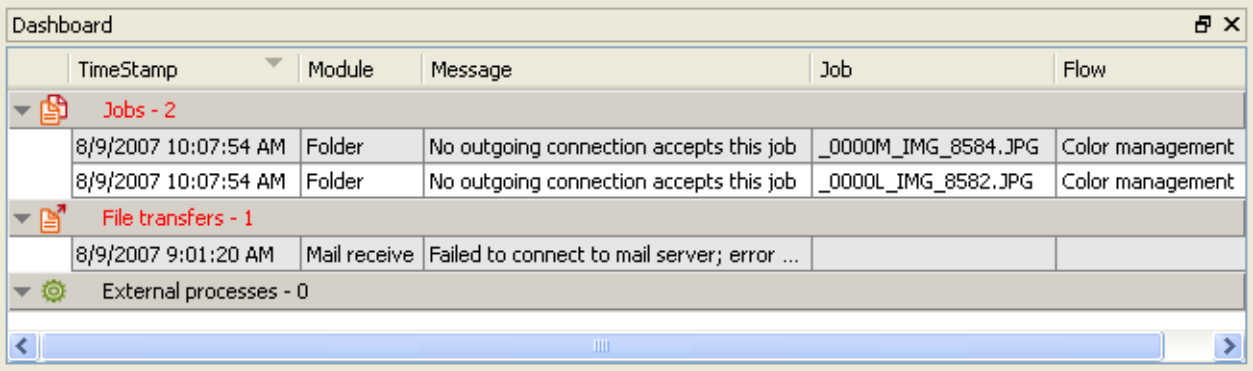
To stop processing is sometimes useful while designing and testing a flow that interacts with a third-party application. Stopping processing suspends Switch's interaction with the external application (and with the file system), so that you can, for example, change a setting in the external application without the need for deactivating the flow.

When in doubt, deactivate and reactivate the flow rather than stopping and restarting processing.

5.2.6.5. Viewing flow problems in the Dashboard pane

The Dashboard pane (displayed by clicking **View** > **Show panes** > **Dashboard**) displays an overview of current flow execution problems at any given time. This is in contrast with the Messages overview, which provides an audit trail of what happened in the past.

Furthermore, the Dashboard allows relevant actions to be taken for certain problem types, such as retrying a problem job.



Wrap text

To display long messages on multiple lines (i.e. "wrapped" rather than chopped off), choose the "Wrap text" menu item in the context menu of the Dashboard pane.

Problem categories

Switch distinguishes in the Dashboard pane between problem jobs (which cannot be processed because of an issue with the job itself) and problem processes (where jobs cannot be processed because of a general issue with the process). Processes are further divided in file transfers and external processes.

Category	Description	Switch action
Problem job	A process failed to handle this job because of an issue that does not affect other jobs; human intervention is required for this specific job but processing can continue for other jobs.	Move the problem job to the Problem jobs folder See *Handling problem jobs* on page 293
File transfer	A Mail, FTP or local network operation cannot transfer any jobs because there is a communication problem; human intervention may be required,	Make all jobs in front of the process wait "inline" in the flow until the problem is resolved

Category	Description	Switch action
	or communication may be restored "by itself".	See *Handling problem processes* on page 294
External process	A built-in tool (such as Compress), a script or a third-party application under the control of a configurator cannot continue processing jobs due to a problem with the process; human intervention is most likely required.	

Information in the Dashboard pane

The information in the Dashboard pane is updated dynamically. A problem item appears as soon as it is detected and disappears as soon as the problem is solved or handled.

Rows

The Dashboard pane shows a header row for each problem category indicating the number of items in the category. The triangle in front of the header row serves to expand or collapse the category. The items in each category may be grouped per flow; grouping can be turned on and off for all categories at the same time through the **Grouping on** menu item in the Dashboard context menu.

Group nodes, if present, are sorted on flow name. The order in which items are sorted within each group (or within the category if there are no groups) can be configured by clicking the column headers in the table.

Columns

The following table describes the columns in the Dashboard pane. You can resize and reorder the columns by dragging the column headers.

Column	Description
Time stamp	The moment in time when the problem was detected.
Module	The Switch module (such as Control) or type of flow element from which the problem originated.
Flow	The name of the flow in which the problem originated (this column is absent when grouping is turned on).
Flow element	The name of the flow element from which the problem originated.
Job Prefix	The unique name prefix of the job referred to in the message, or is left blank if there is no unique name prefix.
Job	The name of the problem job, or the name of the job for which the process problem was detected, or blank if there is no job context.
Message	A message that describes the problem.

Researching problems

The Dashboard pane offers assistance with researching a problem through the following context menu items:

Context menu item	Description
Show flow element	Causes the canvas to select the flow and the flow element listed in the selected problem item.
Show job	Causes the canvas to select the flow and the flow element in which the job listed in the selected problem item currently resides (i.e. a problem jobs folder for the "jobs" category and a regular folder for the other categories). Causes the files pane to show the backing folder of the previously mentioned flow element, and to select the job under consideration.

Retrying problems

The Dashboard pane offers assistance with retrying a problem through the context menu items described in the following table. For more information on retrying problems, refer to *Handling problem jobs* on page 293 and *Handling problem processes* on page 294.

Context menu item	Description
Retry item	Retries the job or process associated with the selected row.
Retry group	For a group row, retries all items in the associated group. For an item row, retries all items in the group that contains the selected row.
Retry category	For a category row, retries all items in the associated category. For a group or item row, retries all items in the category that contains the selected row.

5.2.6.6. Viewing statistics

About Statistics in Switch

Switch allows you to collect information on how long jobs reside in certain folders or states while being moved along a flow. This can be useful to identify performance bottlenecks.

There are two types of statistical data:

- **Folder statistics** calculate the average time jobs reside in a folder for which statistics have been enabled.

- **State statistics** calculate the average time jobs reside in a particular state. A state can be attached to a job folder via the Folder property "Attach job state", and allows you to combine information about several folders having the same function, for example "coming in" or "in progress".

Statistics are not limited to a single flow: Switch **combines all statistics-enabled folders from all active flows in a single set of statistics**. If two or more folders (used in different flows) have the same name, the statistics for these folders are combined in one single entry.

Tip: To receive meaningful results, we recommend calculating statistics only for folders leading to heavy processes, i.e. processes forming a potential bottleneck for resources, such as CPU time or communication bandwidth.

Setting up statistics

- To gather **Folder statistics**, you must enable the **Show in statistics** property of the folder concerned.
- To gather **State statistics**, you must fill out the **Attach job state** property of the folder concerned.

You can only gather statistics for a folder that has outgoing connections. Folders at the end of the flow do not have the **Show in statistics** and **Attach job state** property, because Switch has no control over the time the jobs reside in such a folder.

Remark

- In case of **Folder statistics**, the calculated time is the queuing time between the moment the job is detected and the the moment the job is handed over for processing on an outgoing connection.
- In case of **State statistics**, this is the queuing and processing time between two *different* job states. Note that, due to the fact that statistics are only logged when the job state changes, it is necessary to *introduce an extra dummy state* (which will never be logged) at the end of the last flow element of interest or just before the last folder of the flow (as the last folder has no **Attach job state** property, hence the job state cannot change). In the following example, the time spent in the "Set to MyState" includes the queuing time in the first folder and the processing time in the generic application ("Process"). The second folder was introduced to change the job state to a dummy value.

Note: The time during which a job is blocked (e.g. because the relevant flow was not active or Switch was not running) is also included in the statistics.

Displaying statistics

To display the Statistics pane, click in the Switch toolbar or go to **View** > **Statistics**.

Important: Do not forget to refresh the statistics (by selecting **View** > **Refresh Statistics**), to make sure the most recent information is displayed.

You can display up to three statistics panes (by clicking **View** > **Show panes** > **Statistics 2** or **Statistics 3**) at the same time. This allows you to display a second and third set of statistics (e.g. sorted in a different way).

For more information about this pane, refer to *Statistics pane* on page 84.

Resetting statistics

To remove the collected information, i.e. to set all counters to zero, go to **View** > **Reset Statistics**. Switch will start gathering statistics from scratch.

5.2.7. Handling execution problems

5.2.7.1. Handling problem jobs

While executing a flow, Switch executes processes and moves jobs between processes according to the specifications in the flow definition. However there are situations where a process fails to handle a job properly and it no longer makes sense for the job to move along the flow in its usual fashion. In those cases, Switch moves the job to the Problem jobs folder, a central location for jobs that require human intervention.

Important examples of why a job may be moved to the Problem jobs folder include:

- The job has an invalid file format causing a third-party application to issue a fatal error message.
- The job matches none of the file filters set on the outgoing connections of a particular folder.

Switch offers a number of facilities for handling problem jobs, from detecting their presence to re-injecting them in the flow after the problem has been resolved.

Detecting problem jobs

There are various ways to detect the existence of problem jobs in Switch:

- The *Problem alerts user preferences* allow specifying that a notification email should be sent to the system administrator when a job is moved to the Problems folder.
- The Problem jobs flow element can be placed on the canvas right inside a flow design; its icon displays a red error mark when there are problem jobs present (see *Viewing an active flow* on page 278).
- The Dashboard pane displays an overview of the current problem jobs at any given time. See *Viewing flow problems in the Dashboard pane* on page 289.

Researching problem jobs

Switch assists with locating and researching problem jobs in various ways:

- When you select the Problem jobs flow element in the canvas; the Jobs pane displays a list of the problem jobs (for this flow or for all flows depending on how the Problem jobs flow element is configured).

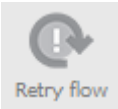
- The context menu for the Dashboard pane provides options to locate the flow element causing the problem in the canvas, and to show the problem job in the Jobs pane. See *Viewing flow problems in the Dashboard pane* on page 289.
- The Messages overview shows all messages issued by Switch and the processes under its control; use the overview's filtering capabilities to pinpoint the messages issued for the problem job or by the process(es) involved in the problem; this may provide some context in case the problem was really caused by an occurrence further upstream. See *Viewing log messages* on page 284.

Retrying problem jobs

When Switch moves a job to the Problem jobs folder, it remembers the original location of the job in its internal job ticket. This makes it possible to move the job back to the location where it left the flow for another attempt at successful processing, without losing any of the job's history (which is also stored in the internal job ticket). The process of moving the job back in the flow is called retrying the job.

It is meaningful to retry a job only after you have fixed the problem (or at least believe you did) by reconfiguring a process, adjusting the flow design, or tweaking the job itself.

Note: Leave the job in the Problem jobs folder and leave its file name intact (including unique name prefix and file name extension); if you change the location or the file name Switch may lose the connection with the job's internal job ticket and it can no longer retry the job.



Switch offers various ways to retry a job:

- When you select the Problem jobs flow element in the canvas (and if it contains problem jobs), the **Retry** button in the tool bar is enabled. Click the **Retry** button to retry all jobs in the selected Problem jobs flow element.
- The context menu for the Problem jobs flow element also offers a **Retry all jobs** option.
- When the Jobs pane displays a list of problem jobs (because the Problem jobs Flow element is selected), its contextual menu offers a **Retry job** option that retries only the selected job(s).
- The context menu for the Dashboard pane provides options to retry one or more of the listed jobs. See *Viewing flow problems in the Dashboard pane* on page 289.

5.2.7.2. Handling problem processes

While executing a flow Switch causes processes to be performed and jobs to be moved between processes according to the specifications in the flow definition. However there are situations where a process is no longer able to continue processing jobs due to some problem with the process itself. In those cases, Switch makes all jobs in front of the process wait "inline" in the flow until the problem is resolved (it makes no sense to move these jobs to the problem jobs folder since there is nothing wrong with the jobs).

Important examples of why a process may fail include:

- There is a network communication problem so jobs can no longer be transferred.
- A property for the process is set to an improper value (Switch attempts to detect invalid properties when a flow is activated but this can never be foolproof in all cases).

Switch offers a number of facilities for handling problem processes, from detecting their presence to re-enabling them once the problem has been resolved.

Detecting problem processes

There are various ways to detect the existence of problem processes in Switch:

- The *Problem alerts user preferences* allow specifying that a notification email should be sent to the system administrator when communication (Email, FTP, local network) is down for more than a specified time, or when an external process fails.
- The flow element corresponding to a problem process is shown in the canvas with a red error mark, providing obvious feedback on its problem state (see *Viewing an active flow* on page 278).
- The Dashboard pane displays an overview of the current problem processes at any given time. See *Viewing flow problems in the Dashboard pane* on page 289.

Researching problem processes

Switch assists with locating and researching problem processes in various ways:

- The context menu for the Dashboard pane provides options to locate the flow element causing the problem in the canvas. See *Viewing flow problems in the Dashboard pane* on page 289.
- The Messages overview shows all messages issued by Switch and the processes under its control; use the overview's filtering capabilities to pinpoint the messages issued for the process(es) involved in the problem; this may provide some context in case the problem is caused by interrelated processes. See *Viewing log messages* on page 284.

Retrying problem processes

The process of re-enabling a process (or at least attempting to do so) is called retrying the process.

It is meaningful to retry a process only after you have fixed the problem (or at least believe you did) by reconfiguring the process, adjusting the flow design, or resolving any relevant issues outside of Switch.

Automatic retry

The *Error handling user preferences* allow automatically retrying a problem process after a specified time interval. Separate values can be specified for different categories of processes.

Automatic retry is especially meaningful for communication processes since a network problem is often resolved by external influences.

Manual retry

Switch offers various ways to manually retry a problem process:

- When you select the flow element in the canvas that corresponds to a problem process, the Retry tool button is enabled. Pressing the Retry tool button retries the process.
- The context menu for the flow element in the canvas that corresponds to a problem process also offers a "Retry" menu item.
- The context menu for the Dashboard pane provides options to retry one or more of the listed processes. See *Viewing flow problems in the Dashboard pane* on page 289.
- When you deactivate and reactivate a flow, all of its problem processes are implicitly retried.
- When you quit and restart Switch, all problem processes are implicitly retried.

5.2.8. Advanced topics for running flows

5.2.8.1. Scheduling jobs

Objectives for scheduling jobs

The Switch job scheduler has the following (sometimes conflicting) objectives, in order of importance:

- Maximize overall throughput, that is, process as many jobs as possible in a given amount of time.
- Allow users to specify individual job priorities: a task for a job with a higher priority should be executed first. This can be used to "rush" a particular job through a flow, or to define a high-priority flow (by assigning a priority to all jobs in the flow).
- Process jobs in order of arrival, that is, jobs should arrive at the end of a flow in the order they were placed in the flow to begin with (FIFO = first-in/first-out).

These objectives are not absolute: enforcing some particular order of execution to the letter would sacrifice throughput and/or overly complicate the implementation.

Internal job ticket

To support these objectives, the internal job ticket for each job stores the following fields:

- Job priority: a signed integer number that determines the priority of the job; a higher number indicates a higher priority; the default priority is zero.
- Arrival stamp: a signed integer number that indicates the order in which this job first arrived in a flow, as compared to other jobs.

Execution slots

The scheduler manages a number of slots in which tasks can be executed in parallel. The maximum number of concurrent slots is determined for each category of tasks as described in the following table.

Note: For an overview of the flow elements belonging to each of these categories, refer to *Switch performance tuning* on page 463.

Task category	Task types in this category	Maximum concurrent slots for this category
Disk	*File handling tasks*, such as copying & moving jobs	5
Network	*Network transfer tasks*, including FTP send/receive, Mail send/receive, Checkpoint via mail.	Determined by the value of "Concurrent network transfer tasks" preference (See *Switch preferences: Processing* on page 41)
Processor	*File processing tasks*, executed by configurators and apps and flow elements such as archive, unarchive, 'heavy' scripts,... Note that light scripts belong to a separate category (see paragraph below).	Determined by the value of "Concurrent processing tasks" preference (See *Switch preferences: Processing* on page 41)
Light	Light scripts used in the Script element (see paragraph below)	5 + value of "Concurrent processing tasks" preference (See *Switch preferences: Processing* on page 41)
TimerFired	Any timerFired entry point invocation	Minimum: 2 Maximum: twice the value set of "Concurrent processing tasks" preference (See *Switch preferences: Processing* on page 41)
WebhookTriggered	Any webhookTriggered entry point invocation	Minimum: 2 Maximum: twice the value set of "Concurrent processing tasks" preference (See *Switch preferences: Processing* on page 41)

Within each category concurrency is further limited by the serialization needs of each task type. Thus even when a slot is available for a particular category, a task in that category may not match the slot because, for example, another task of the same type is already executing and the task type has the serialized execution mode.

Light and heavy scripts

Scripts include many of the tools built-in to Switch, and all third-party script packages.

Initially a script is heavy. If its entry points consistently complete quickly (in less than 1 second for 5 consecutive times) the script becomes light, until it violates this "trust" by not completing within 1 second once – it then becomes heavy again.

Scheduling tasks

The scheduler removes tasks from the task queue and schedules them for execution in one of the available slots. The scheduler attempts to schedule a task:

- Each time a new task is queued (because a slot may be available that does not match the previously queued tasks).
- Each time an execution slot becomes available because a task has completed (because there may be a queued task that matches this slot).

The scheduler selects a task for execution by narrowing down the set of queued tasks using the following steps:

1. Start with the set of all tasks on the queue that match any available execution slot.
2. Narrow down to tasks for jobs that have the highest job priority in the task set.
3. Narrow down to the task that was placed on the queue first.

The selection process ends as soon as the result set contains a single task (in which case the task is scheduled for execution) or is empty (in which case no action can be taken). The last step selects a single task so the selection process always ends.

5.2.8.2. Job priorities

The internal job ticket for each job contains a field that determines the priority of the job.

Tasks for jobs with a higher priority are executed first (unless the higher-priority task has no matching execution slot; see *Scheduling jobs* on page 296). This can be used to "rush" a particular job through a flow, or to define a high-priority flow (by assigning a higher priority to all jobs in the flow).

A job priority is a signed integer number (in the range that can be represented with 32 bits). A higher number indicates a higher priority. The default priority is zero; relative to the default a priority can be higher (positive numbers) or lower (negative numbers).

A job's priority can be set through one of the properties of the folder flow element and through the scripting API.

5.2.8.3. Arrival stamps

The internal job ticket for each job contains a field that records the job's arrival stamp.

Unless job priorities dictate otherwise, Switch processes jobs in order of arrival (if there is a matching execution slot). Switch uses the arrival stamp to determine which job arrived first. See *Scheduling jobs* on page 296.

An arrival stamp is a signed integer number (in the range that can be represented with 32 bits). It indicates the order in which a job first arrived in a flow, as compared to other jobs. Switch maintains a persistent and global arrival count that gets incremented each time a new arrival stamp is handed out. Thus a higher number indicates a more recent arrival.

Several jobs may have the same arrival stamp. This happens when multiple jobs are generated from the same original job, or when for some reason no arrival stamp was assigned to a job.

Stamping jobs

Switch assigns a new arrival stamp to a job when it first detects the job in a folder or submit hierarchy, or when a producer (such as FTP receive or Mail receive) first injects the job into a flow. A job's arrival stamp is not affected while the job is moving along a flow. Results generated for a job (such as a preflight report, or a duplicate of the job) retain the original job's arrival stamp.

In certain situations a job's arrival stamp needs to be refreshed (that is, assigned a fresh stamp) so that the job is not unduly processed before other jobs. For example, a Checkpoint refreshes the arrival stamp when moving a job along one of its outgoing connections.

5.3. Working with apps in Switch

5.3.1. About the Switch apps - an introduction

What are Switch apps?

Apps are small applications that can be used as flow elements in Switch, without the need for a license for the Configurator module. They are available through the Enfocus Appstore and not linked to any Switch release: therefore, you can immediately install and use them in Switch.

Where to find apps?

You can search for Switch apps in the *Enfocus Appstore (our webshop)* or from within Switch, through the search function in the Flow elements pane. The apps matching your search results are displayed in the bottom part, together with a link to the Enfocus Appstore, where you can buy them and immediately use them in your flows (even without restarting Switch!). For the detailed procedure, see *Finding apps* on page 302.

Purchasing apps

Apps are sold through the Enfocus Appstore. Some apps are free, some are sold for a fixed price (traditional/perpetual license), but for most apps you have to pay a subscription fee. See *Purchasing an app* on page 304. If your subscription is about to expire, you'll receive an email and a notification in Switch. Make sure to pay the subscription fee in time, so your flows remain valid.

Not sure if a particular app suits your needs? You can download a free trial. See *Trying an app for free* on page 303.

Note: Sometimes the people who buy apps are not the people who use them. Is this the case for you? Make the person who buys the apps a "Switch manager" of the Switch installation on which the app will be used. See *Adding a Switch manager* on page 307.

Using apps on different Switch installations

Apps are linked to a Switch installation. You can however assign an app to a different Switch and use it there without having to buy an additional license. If you want to use your apps on different Switch installations at the same time, you need of course multiple licenses.

For more details, refer to see *Assigning an app to a different Switch installation* on page 307.

New versions

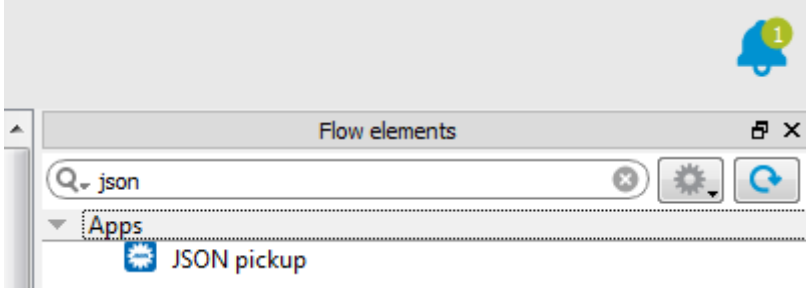
As soon as there are new versions of the apps you have purchased, you'll receive a notification in Switch and you're entitled to use this new version immediately. For the detailed procedure, see *Installing a new version of an app* on page 305.

Note that you're never obliged to switch to a newer version, and that you can go back to a previous version as required.

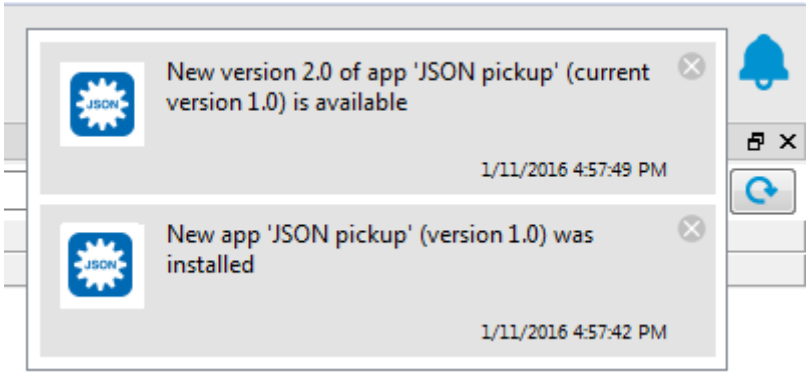
Notifications

As soon as you start working with the Enfocus Appstore, you'll get notifications. They are displayed in the top right corner of the application. They inform you about newly installed apps, new versions, the status of your license (e.g. apps that are about to expire,...)

If a notification is available, you will see a "bell" icon. The number indicates the number of new (unread) notifications that are waiting for you.



You can open the notifications by clicking the icon and closing them again by clicking anywhere in Switch. However, if you don't want to see the message anymore, you should click the cross icon, and the notification will disappear.



Apps versus configurators

Apps are similar to configurators, yet there are a number of differences as explained in the table below.

Apps	Configurators
Purchased through the Enfocus Appstore	Installed with Switch
You can only buy the apps you need	Fixed set of configurators
Not linked to a Switch release	Linked to Switch release
Subscription model (for most apps)	License model (included in the Configurator Module)
Can be used with the Switch Core Engine	Configurator Module required
Can have all kinds of functionality	Connect to third-party software

5.3.2. About the Enfocus Appstore

The Enfocus Appstore

The Enfocus Appstore is the Enfocus webshop where you can purchase apps for use in Switch, developed by third-party app creators.

The Enfocus Appstore is available via *https://appstore.enfocus.com* or from within Switch, by clicking the **Go to the Enfocus Appstore** button in the Flow elements pane.

There you'll find an overview of all Switch apps currently available. For more information about a particular app, simply click the logo or description. On the detail page, you can find detailed information about the way the app works, the required Switch version or platform, support info, how much it costs,... Starting from this page, you can also install a free trial or buy the app.

My Appstore

If you want information about the apps you have purchased and/or tried, you have to sign in to the Enfocus website with your Enfocus ID. Clicking your username (in the top right corner of the screen) gives access to a menu of which "My Appstore" is one of the options. My Appstore gives access to the following sections:

- **My apps** lists all apps you have purchased. Here you can also find the status of your apps:

- **Unassigned apps** are apps for which you have a valid license, but that are not assigned to a particular Switch installation yet. Refer to *Assigning an unassigned app* on page 306.

- **Expired apps** cannot be used anymore because the license has expired. You have to pay the subscription fee in order to be able to use them again. To do so, click the **Buy now** button.

- **My Switch** provides information about the Switch installation(s) linked to your Enfocus ID. There are two ways to link a Switch installation to an Enfocus ID:

  - When you sign into Switch using an Enfocus ID, that Switch installation is registered automatically in the background. Note that the name mentioned in the list is determined by the name set in *the Switch preferences (Internal Communication)*.

  - When another user wants to allow you to buy and assign apps to his/her Switch installation as well, he can add you as a Switch manager for that Switch installation. In that case, that Switch installation will also be linked to your Enfocus ID and you'll see it under **My Switch**.

  Here you can also add extra **Switch managers** for your Switch installation: people allowed to buy and assign apps to your Switch installation. You are automatically a Switch manager of your own Switch (registered as such when you sign into your Switch), and you can add as many other people as you want to, by adding their email addresses. Note that Switch managers have also access to the Switch Insight Dashboard. See also *Adding a Switch manager* on page 307 and *The Switch Insight Dashboard* on page 461.

  The apps that can be used on your Switch are called "assigned apps".

  Note: On this page, you also find a **Forget Switch installation link**. Use this link only if your Switch Server is no longer accessible, e.g. due to hardware issues and you cannot uninstall the apps in Switch. Using this link, all apps will be uninstalled in one go and all flows using apps will stop running. Your apps will become available again under My apps, and you can re-assign them to another Switch installation as required.

- **My payments** lists the apps you have purchased yourself.

5.3.3. Finding apps

This topic describes how you can find an app using the search function in Switch.

Note: Alternatively, you can directly go to the Enfocus Appstore by clicking the blue **Go to the Enfocus Appstore** button (at the bottom of the **Flow elements** pane).

To find an app in Switch

1. In the Flow elements pane, enter (part of) a keyword in the search field at the top of the pane.
   The matching *configurators* are shown in the upper part of the pane, whereas the matching *apps* are shown at the bottom, in the Enfocus Appstore section.

2. To know what the listed apps can do, hover over the items in the Enfocus Appstore section and check the tooltip.

3. For a detailed explanation, click the app in the list.

You're redirected to the Enfocus Appstore, where you get detailed information about the app, for example a full description, compatibility and version info, the name of the author, screenshots, the subscription fee, ... On this page, you can start a trial or buy a license. See also *Trying an app for free* on page 303 and *Purchasing an app* on page 304.

Note: Enfocus does not offer support for apps that were developed by third-parties. In case of problems, please contact the app creator (mentioned on the app detail page in the Enfocus Appstore, under **Support**).

5.3.4. Trying an app for free

If you have found an app that is interesting to you, you can start a free one-month trial.

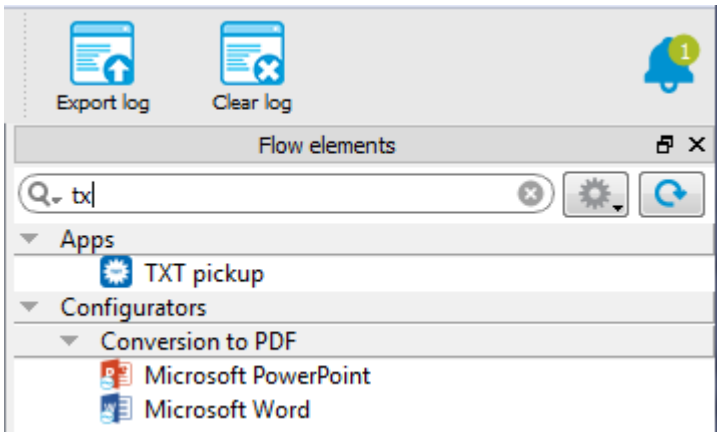
To start a trial

1. On the detail page of the app in the Enfocus Appstore, click the **Try it for free** button.
2. Sign in with your Enfocus ID and password as required.
3. Assign the app to the Switch installation that you will use to work with the app.
   By default, if you have more than one Switch, the app is assigned to all your Switch installations. If you don't want this, clear the checkbox(es) as required.
4. Click **Start free trial**.
   The app is downloaded to the assigned Swith installation(s).
5. Do one of the following:
   - If Switch is running, you can start using the app immediately by clicking the **Refresh apps** button in the top right corner of the Flow elements pane. This will install the app in your local Switch.

     Note: If you don't click the **Refresh apps** button, the app will be installed automatically next time you start Switch.
   - If Switch is not running, next time you sign into Switch, the app is installed automatically in the background. You don't have to do anything.

     Note: If you start Switch without being signed in, the app will not be installed.

You'll find the new app in the **Apps** category of the Flow elements pane. Note that you'll also get a notification to inform you that the app has been downloaded and installed on your system.



You can now use the app just like any other flow element. You can use it in your flows, define its properties, ... Apps also have a context menu (similar to the context menu of the configurators) that you can use to check the app details, to manage your subscription, ... When your trial is about to expire, you'll get a notification. If you want to continue using the app, you'll have to buy a license. See *Purchasing an app* on page 304.

5.3.5. Purchasing an app

Apps are sold through the Enfocus Appstore. Most apps are sold via yearly subscriptions, some are free of charge.

To purchase an app

1. On the detail page of the app in the Enfocus Appstore, click the **Buy now** button.
2. Sign in with your Enfocus ID and password as required.
3. Follow the payment and registration instructions.
4. Assign the app to the Switch installation that you will use to work with the app.

   Note:

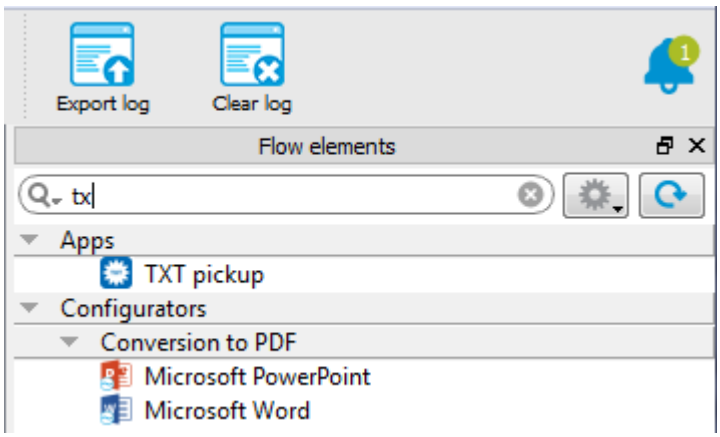
   - If you have bought several licenses for the same app, you can assign each license seat to a particular Switch installation.
   - If you don't want to assign the app yet to a particular Switch, click **.. or assign all later**. The app will not be installed locally (hence it cannot be used), but it remains available in the Enfocus Appstore (under **My apps**).

5. Click **Assign now**.
   The app is downloaded to the assigned Swith installation(s).
6. Do one of the following:
   - If Switch is running, you can start using the app immediately by clicking the **Refresh apps** button in the top right corner of the Flow elements pane. This will install the app in your local Switch.

Note: If you don't click the **Refresh apps** button, the app will be installed automatically next time you start Switch.

- If Switch is not running, next time you sign into Switch, the app is installed automatically in the background. You don't have to do anything.

You'll find the new app in the **Apps** category of the Flow elements pane. Note that you'll also get a notification in Switch to inform you that the app has been downloaded and installed on your system.



You can now use the app just like any other flow element. You can use it in your flows, define its properties, ... Apps also have a context menu (similar to the context menu of the configurators) that you can use to check the app details, to renew your subscription, or to uninstall the app if you don't need it anymore. See also *Uninstalling an app* on page 306.

5.3.6. Installing a new version of an app

If a new version is available, you can update the app for free (but you are not obliged to do so). You can also downgrade as required.

Proceed as follows:

1. Do one of the following:
   - When a new version of an app is available, you will get a notification in Switch. To get more information about this new version, click the notification.
   - Alternatively, go to the **My Apps** page via My Appstore. Search the app concerned, and click **Change version** beside its name.

   The Change Version page appears.
2. Select the version you would like to install.
3. Check the release notes and the compatibility section on the lower part of the page.
4. If you're sure you want to install the new version, click **Change version**.
5. Do one of the following:

- If Switch is running, click the **Refresh apps** button in the top right corner of the Flow elements pane. This will update the app in your local Switch.
- If Switch is not running, next time time you log into Switch, the app is updated automatically in the background. You don't have to do anything.

In Switch, you'll see a dialog with information about the version change.

6. Click **OK**.

   You can still cancel the update if necessary.

   All flows are temporarily deactivated, the app is updated, and finally the flows are re-activated automatically. You can go on using the updated version of the app.

5.3.7. Assigning an unassigned app

In order to use an app, it must be assigned to a Switch installation. Apps that were purchased but not assigned to a Switch installation are "unassigned" apps. They remain available via your account section on our website.

To start using them, proceed as follows

1. Go to *http://www.enfocus.com*.
2. In the top right corner of the screen, click **Sign in** and sign in with your Enfocus ID.
3. Click your username and select **My Appstore** > **My apps**.
4. Go to your unassigned apps.
5. Select one of your Switch installations from the **Assign to** list.
6. Click **Assign**.
   The app is downloaded and installed on the selected Switch device.
7. Do one of the following:
   - Start the Switch installation selected in step 3 and sign in.
   - If Switch (on the device selected in step 3) is running and you're signed in already, click the **Refresh apps** button.

   The app is shown in the **Apps** category of the Flow elements pane.

5.3.8. Uninstalling an app

Uninstalling an app means that you remove the app from your local Switch. It will be no longer shown in the Flow elements pane and it's no longer assigned to your Switch device, but it remains available in the Enfocus Appstore (under **My Apps**) (as long as you've paid the subscription fee).

There may be several reasons to uninstall an app, for example:

- You want to use the app on another Switch installation. In that case, you first have to unassign it from one system and then reassign it to the other system.

- You want to remove an expired app (displayed in gray in the Flow elements pane) from your Switch.

To uninstall an app

1. Launch Switch on the device on which you don't want to use it anymore.
2. In the **Flow elements** pane, in the **Apps** category, search for the app you want to uninstall.
3. Open the context menu.
4. Click **Uninstall**.
   A warning appears.
5. Click **OK**.
   If the app is used in an active flow, the flow will be deactivated. It will not be possible anymore to activate the flow (unless you remove the app from the flow).

5.3.9. Assigning an app to a different Switch installation

You can use an app with a different Switch installation than the one that it's currently assigned to.

To do so

1. *Uninstall the app you want to reassign.*.
   The app will no longer be linked to the Switch installation you're currently using.
2. Go to *http://www.enfocus.com*.
3. In the top right corner of the screen, click **Sign in** and sign in with your Enfocus ID.
4. Click your username and select **My Appstore** > **My apps**.
5. In the section about unassigned apps, assign the app you just uninstalled to the Switch installation of your choice.

   Note: If it does not appear in the list, you are not a Switch manager for that installation, so you don't have the right to assign apps. Ask the owner of the Switch installation to add you as a Switch manager or sign into the Switch installation, to link it to your Enfocus ID.

6. Sign into the Switch installation selected in step 5.
   If you were already logged in, make sure to click the **Refresh apps** button in the Flow elements pane.
   The app is listed in the Apps category and is ready for use.

5.3.10. Adding a Switch manager

If you want someone else to buy and install apps for you, you must make this person "Switch manager" for your Switch installation.

Note that this user will also have access to the *Insight Dashboard* for your Switch (if enabled).

To add a Switch manager

1. Go to *http://www.enfocus.com*.
2. In the top right corner of the screen, click **Sign in** and sign in with your Enfocus ID.
3. Click your username and select **My Appstore** > **My Switch**.
   Here you will see all information concerning the Switch installation(s) linked to your Enfocus ID, such as the name, the Switch version and the Switch managers. Note that all users having signed into the Switch installation concerned have been registered automatically as Switch managers. You can add or remove Switch managers as required.
4. Beside **Switch managers**, click **edit**.
5. Enter the email address of the person that should have the right to buy and assign apps to your Switch installation.
6. Click **Add**.
7. Click **Save**.

The person that you have added as Switch manager will now see your Switch installation under **My Switch** in the Enfocus Appstore. When this person buys apps in the Enfocus Appstore he will be able to assign them to your Switch installation.

5.4. Using the Switch Web Portal

The Switch Web Portal allows users to access the Switch Server through a web browser. This means that users can access the Switch Server from another computer than the one that is running the Switch Server, without the need for a Switch Designer.

Currently, the following functionality is available:

- Viewing log messages issued by the Switch Server. This includes customizing the messages overview (sorting, filtering, etc) and exporting and clearing messages as required.
- Viewing and finding jobs processed by the Switch Server. This includes creating your own job board(s), which allows you to visualize the jobs present in certain flows and with certain flow stages. If you have purchased a Reporting Module license, you can use the data on these job boards to create dashboards with counters and graphs.
- Submitting and checking jobs, on condition that you have licensed the SwitchClient Module.

Note that users should be granted access via the Users pane.

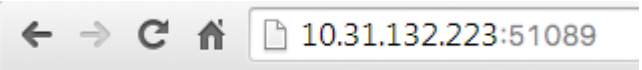
The connection can be encrypted as required (HTTPS); this can be configured through the user preferences (Switch preferences: Web Services).

5.4.1. Signing in to the Switch Web Portal

To sign in to the Switch Web Portal

1. Open a browser.
   Google Chrome, Safari, Edge and Firefox are supported.

2. Enter the IP address or the hostname of the computer running the Switch Server followed by ":" and the port number for the Switch Web Portal (as set in the Switch Preferences (Web Services category)). The default port number is 51089.
   For example:

   A login screen appears. The first time you'll see a banner stating that cookies on the site are used to enhance the user experience.

3. In the banner, click **Accept** to allow Switch to save your preferences.
   If you accept cookies, your preferences are saved by the browser. As a consequence, you don't have to set your preferences next time you sign in; they are remembered. If you click **Do not use cookies**, you can continue to work, but you will have to set your preferences again next time you log in.

4. Enter your user name and password and click **Sign in**.

   The Switch Server must be running, otherwise you will not be able to sign in.

   The Switch Web Portal main screen appears. What you can see and do, depends on your permissions (as configured by the Switch administrator through the Users pane).

5.4.2. Changing the language of the Switch Web Portal

By default the language on the Switch Web Portal is determined by your system's local settings.

To select a different language (i.e. one of the Switch languages), proceed as follows:

1. In the top right corner of the screen, click your user name.

   The name displayed is your user name as defined in the Users pane in the Switch Designer.

2. Click the language of your choice.

   Possible languages:

   - English
   - German
   - French
   - Japanese
   - Chinese

Your choice is remembered. Next time you sign in to the Web Portal (through the same browser), the content will be displayed in the chosen language.

5.4.3. Viewing log messages through the Switch Web Portal

If you have the right permissions, you can view the log messages in a browser without having to open a Switch Designer. The permissions are set through the Users pane.

To view the log messages

1. Sign in to the Switch Web Portal.

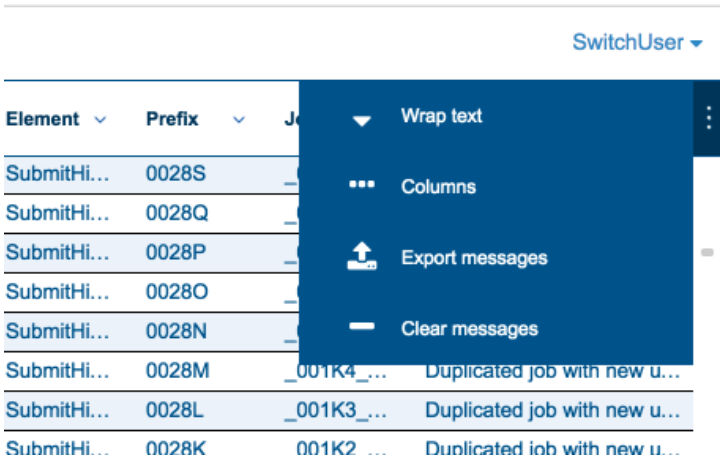
See *Signing in to the Switch Web Portal* on page 308.

2. If the messages are not displayed, in the navigation area on the left, click **Messages**. The most recent log messages are displayed, with a maximum of 1000 messages in total. If the autorefresh option is turned on (at the bottom of the screen), the list is automatically renewed. By default, the list is sorted chronologically, most recent messages at the top.

   Remark:

   - If the message text is too long to be displayed, you can turn on the **Wrap text** option.
   - If you don't want to see all columns, you can hide some of them using the **Columns** option.

   Both options are available in the menu that appears when you click the button on the right, below your user name (see screenshot).



You can now sort the messages, filter out the messages you're not interested in, or export messages as required. Refer to *Filtering log messages* on page 285, *Sorting log messages* on page 287 and *Exporting log messages* on page 287.

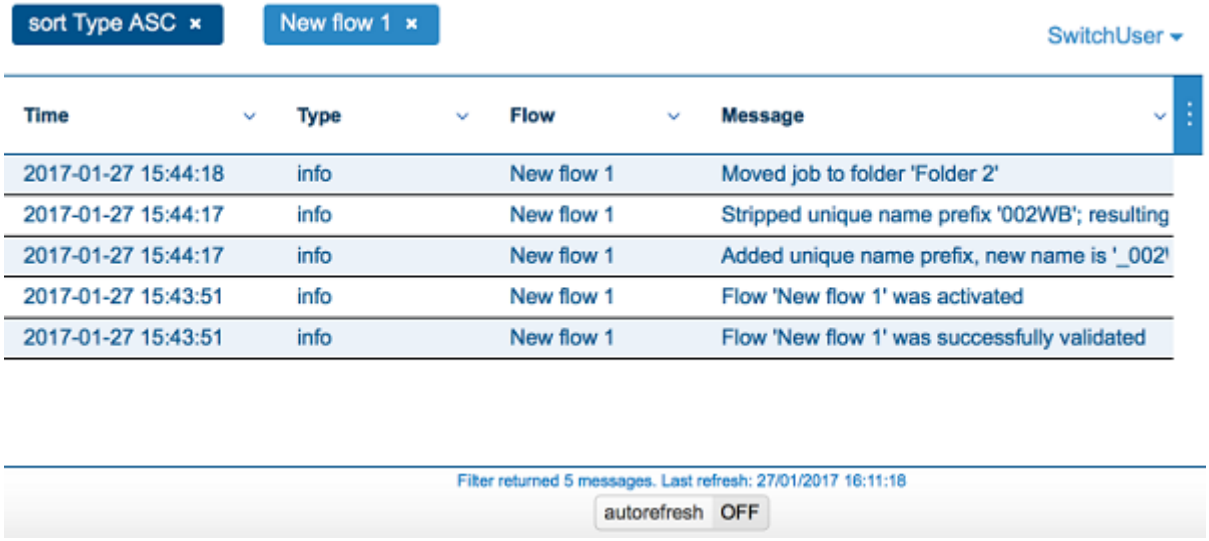
5.4.3.1. The Messages overview

This topic describes the Messages overview. You can open this overview in different ways:

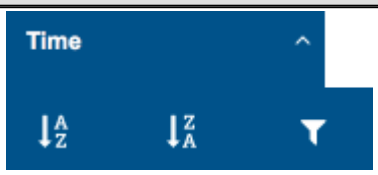
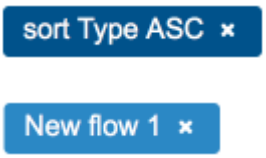
- Through the Switch Web Portal.
- By clicking the **Messages** button in the toolbar of the Switch Designer. Alternatively, you can press **F6** or select **View** > **Messages**.

Buttons and menus

The table below explains the meaning of the main buttons, labels, icons and menus in the Messages overview.



Button/menu	Description
SwitchUser ▾	Shows the name of the user that logged in. If you click the icon ▾, you'll get a menu where you can change the language and sign out as required. See *Changing the language of the Switch Web Portal* on page 309. **Note:** If you open the Messages overview *from within Switch*, this option is not available. In that case, the Messages overview is displayed in the language of the Switch Designer.
⋮	Opens a menu with the following options: • **Wrap text**: Moves text that does not fit on one line (because the column is too small) to the next line (instead of cutting it off). • **Columns**: Allows you to show or hide columns as required (and afterwards reset them as required). • **Export messages**: Allows you to export the *filtered* log messages to a .csv file. You can either open the file or save it locally. • **Clear messages**: Allows you to remove all log messages from the log database. Note that there is no undo for this action!
Time ⌄	If you click a column header, the sort and filter options are displayed. For most columns, you can change the sort order (A-Z or Z-A) and/or set a filter (e.g. only display the messages of the last x hour(s)/day(s), only the ones that contain a certain string, ...). See also *Filtering log messages* on page 285.

Button/menu	Description
	
	The applied filters are listed in the white space above the column headers. In this example, the dark blue label indicates that the messages are sorted by the values in the Type column, from A-Z (ascending). The light blue label indicates that only the messages triggered by "new flow 1" are shown.
autorefresh 	Allows you to refresh the page automatically, to always have an up-to-date overview. When turned on (default), the button is blue; when turned off, the button is gray. You can enable this option only if the sort order of the "Time" column is set to "Descending (Z-A)". If you change the sort order, the autorefresh option is disabled automatically.

Columns

The following table describes the columns in the Messages overview.

Remember that you can hide columns as required via the icon in the top right corner. It's also possible to resize the columns and to move them to another position (by dragging them sideways).

The **Reset view** option sets the columns to their default position and size and makes them all visible. This option is also accessible via the context menu of the Messages view.

Column	Description
Time	Date and time when the message was triggered.
Type	Message type, indicating the severity level of the message (error, warning, info, debug or assert). See also the table below (Message types).
Module	The Switch module (such as Control) or type of flow element (such as folder) that triggered the message.
Flow	The name of the flow that triggered the message.
Element	The name of the flow element that triggered the message.
Prefix	The unique name prefix of the job referred to in the message, or blank if there is no unique name prefix.
Job	The name of the job for which this message was issued.

Column	Description
Message	The message itself.

Message types

The following table describes the different types of messages that can appear in the Type column of the Messages overview.

Type	Description
Info	An informational message that has no other purpose than to inform the user of a certain occurrence. *Info messages are always shown in the Messages overview (unless a filter is applied).* The Messages overview displays all types of info messages (related to Switch Server and to Switch Designer).
Warning	A warning message that informs the user of a recoverable problem or non-fatal error. *Warnings are always shown (in orange) in the Messages overview (unless a filter is applied).*
Error	An error message that informs the user of a fatal error. *Errors are always shown (in red) in the Messages overview (unless a filter is applied).*
Debug	An informational message solely intended for debugging purposes (often generated by configurators). *Debug messages are not shown by default. If the* ***Log debug messages*** *preference is enabled*, you can display them using a filter. Refer to Switch Preferences: Logging.
Assert	A message solely intended for debugging purposes that is issued only when a coding error is discovered. Assert messages are not shown by default. *If the* ***Log debug messages*** *preference is enabled*, you can display them using a filter. Refer to Refer to Switch Preferences: Logging.

Note: Scripters have access to all messages, to be able to debug their scripts.

5.4.3.2. Filtering log messages

To filter the log messages

1. Click the header of the column you want to use to filter the messages.

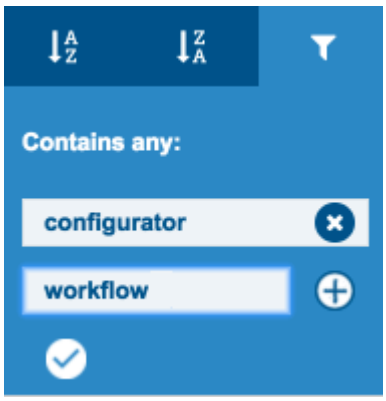
2. In the menu that appears, click the filter icon.

3. Set your filter as required:
   There are some small differences depending on the chosen column.

   - In the **Time** column, select the filter of your choice from the list and configure it as required. For example, to only view the latest messages, select **After** and click the date and time of your choice. Other filter options are:
     - Messages issued in the last x number of hours or days
     - Messages issued before or after a particular date and time, or between two dates (with a precision of 5 minutes)
   - In the **Type** column, select the checkbox of the messages type(s) you want to view in the list, for example Error and Warning. See also *The Messages overview* on page 310.
   - In the other columns, enter one or more strings to only view the entries that contain those strings. The case of the entered strings is not taken into account.

     Note:
     - To view messages that contain several strings in one entry (e.g. configurator AND workflow), type those strings in one filter field.
     - To view messages that contain either string x or string y (e.g. configurator OR workflow), type those strings in two different filter fields (see screenshot).

       Extra filter fields are added by clicking and removed by clicking the cross button.



4. Click to confirm.
   The filter is applied immediately. The strings used to filter the messages are displayed above the columns in blue labels.

5. To clear a filter, click the cross icon in the blue label.
   The label is removed and the messages overview is updated immediately.

Remark for Web Portal users only

You can save your message filters by clicking the **+ Save current filter** button in the blue navigation area.

5.4.3.3. Sorting log messages

To sort the log messages

1. Click the header of the column you want to use to sort the messages.

   The Messages overview can be sorted by the values in all columns except for the Messages column.

2. Choose the preferred sort order:

To sort	Click
Ascending, from old to new (Time column)	
Descending, from new to old - this is the default sort order (Time column)	
Ascending, from A to Z (all other columns, except for Messages)	
Descending from Z to A (all other columns, except for Messages)	

   The new sort order is applied immediately and indicated in the white space above the messages (in a blue label), e.g. "sort Module DESC" means that the messages are sorted by the items in the Module column, in descending order.

5.4.3.4. Exporting log messages

Log messages can be exported to a CSV file for processing by third-party tools. If you have set filters, these filters are taken into account; only the messages that are shown will be exported to a file.

Note: As of Switch 2017 it is no longer possible to export log messages to an XML file.

To export log messages

1. Open the Log messages overview.

2. Do one of the following:

   - Click the icon in the top right corner and click **Export messages**.
   - Right-click in the overview and click **Export messages**.

A log.csv file is created.

5.4.3.5. Clearing log messages

Log messages are stored in a database on disk and thus remain available after quitting and restarting Switch. The application data preferences determine for how long messages are retained.

To permanently clear all log messages

1. Open the Log messages overview.
2. Do one of the following:
   - Click the icon in the top right corner of the overview and click **Clear messages**.
   - Right-click in the overview and click **Clear messages**.

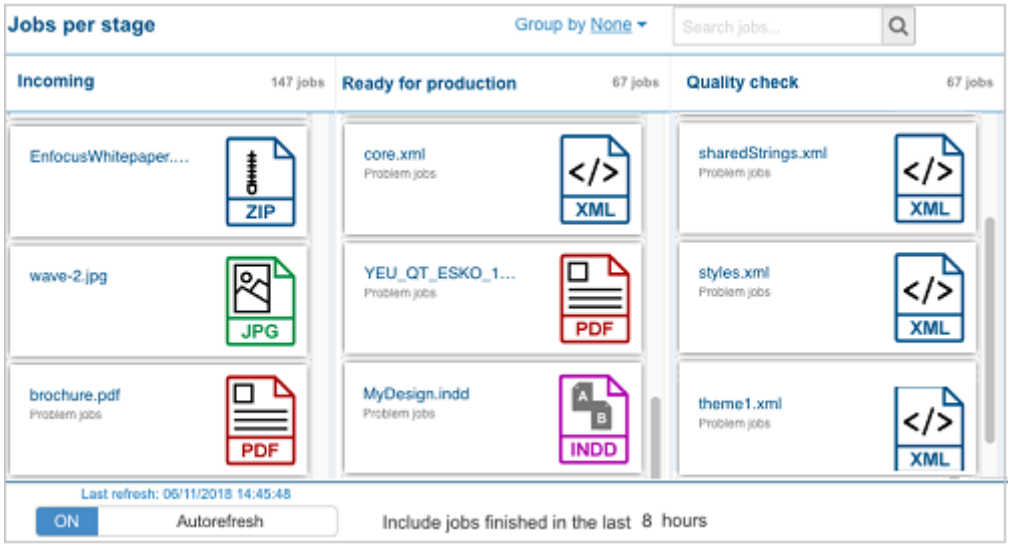
A confirmation dialog appears. If you click **Yes**, all messages will be removed from the log database. **Note that there is no undo for this action!**

5.4.4. Finding Switch jobs through the Switch Web Portal

5.4.4.1. About job boards

Job boards (aka Job finder boards) were introduced in Switch 2018. These boards provide you with a handy tool to follow up on the status of your jobs. No need to use a (Remote) Designer to watch how your jobs move through the flows; instead you can open a browser on any computer, log into the Switch Web Portal and create your own job board(s) with only those flows and jobs that are of interest to you.

Here is an example of a job board that shows you which jobs are in which stage. The jobs can be further grouped by flow or state, using the *Group by* field in the top right corner of the screen.



At the bottom of the screen, there is an extra filter 'Include jobs finished in the last x* hours', which allows you to determine how long finished jobs should remain on the job board.

Note: Access to job boards and dashboards is configured through the Users pane in Switch, hence it's possible that you don't have access to this functionality or that you can only view shared boards but not create new ones yourself.

* *Remark for Switch administrators:* Note that this value cannot be higher than the value of Keep internal job tickets for (hours) in the *Switch Application data preferences*; if the internal job ticket is removed, the job does not exist anymore in Switch, hence it cannot be shown anymore on a job board.

5.4.4.2. Creating a job board

A job board on the Switch Web Portal can display the jobs of your choice. You can select the flows for which you want to display jobs and - if you want to - only show those jobs that have a certain job status or that are in a certain job stage.

Note: Job boards are linked to your user account. Other users can't see them, unless you share them.

To create a job board

1. With the **Boards** view selected, click **+ Manage**.

   If you don't see + Manage in the expanded navigation area on the left, you may not have the permissions to create boards.

   The **Manage boards** dialog appears.

2. In the bottom right corner of the dialog, click **New job board**.

   If you don't see the New job board button, you may not have the permission to create boards.

3. Configure your board:
   a. Enter a name for your board.
   b. Click **Select flows** (the blue button to the right of the navigation area).
   c. In the dialog that appears, select the flows you want to see on your job board. To do so, click **Select all** (if applicable) or click the flow name of the flows you want to select.

      Flow groups are shown in gray, flow names in blue. You can select all flows in a group by clicking the group name.

      Note: Make sure to select all flows you want to see on your job board; in the next step you can divide these flows over different columns.

   d. Click **Apply**.

4. Configure the first column of your job board:
   a. Enter a column name.
   b. Select at least one flow.
   c. Select the flow stages if applicable.

      Problem jobs and **No stage** are by default available. If stages have been defined in the selected flows, they will be added and can be shown as well.

If nothing is selected, all jobs are shown, regardless of their job stage.

5. To add another column, click the plus button to the right of the configured column and proceed in the same way. You can add as many columns as you need.

6. Click **Save**.

5.4.4.3. Managing a job board

This topic explains how to handle the custom job boards on the Switch Web Portal.

Proceed as follows:

1. In the navigation area on the left, click **Boards**.

   Make sure the navigation area is expanded (by clicking).

2. Click **+ Manage**.
   The **Manage boards** dialog appears. This dialog gives an overview of the boards you have access to. The grayed out boards are shared by other users; you can view them but not make any changes. The other boards are your own boards and are fully controlled by you.

3. Do one of the following as required:

To...	Do the following:
To create a new job board	Click **New job board** (blue button in the bottom right corner). See also *Creating a job board* on page 317.
To show or hide a job board in the navigation area	Click the slider in front of the job board you want to show or hide. If the slider is blue, the job board is visible in the sidebar. **Note:** This functionality is useful for job boards you want to keep for later use or for job boards that you want to use as dataset for a dashboard (for users of the Reporting module).
To edit a job board	Click the edit button. **Note:** Alternatively, you can click the edit button beside the job board name in the navigation area. You can now edit the board name and the columns: • To change the number of flows on board level, you should click the *blue button* ("x flows selected") next to the board name.

To...	Do the following:
	• To add a new column, click the plus icon to the right of the last configured column. • To move the columns to another position, click the icon and drag the columns you want to move sideways. **Note:** Instead of dragging the sliders to make a selection, you can just click the group, flow or stage name to make a selection or to undo a selection. To return to view mode, click the **Save** button (in the top left corner, next to the name of the board).
To share a job board or to stop sharing it	Job boards can be shared with other members of the same user group (as configured in Switch). To share or stop sharing, in the Sharing column of the board concerned: **1.** Click **Private/Shared**. **2.** In the dialog that pops up, select or clear the checkbox of the group(s) with whom you want to share your board. If no dialog pops up, you cannot share the board (for example because you're not configured as member of a group). **Note:** Shared boards can only be viewed (not edited!) by other users.
To permanently remove a job board	Click the remove button. ✖

4. To save the changes made in the Manage jobs dialog, click **Apply**.

5.4.4.4. Viewing and finding jobs on a job board

If you have the right permissions, you can view Switch jobs through the Switch Web Portal. The permissions are set by the Switch administrator through the Users pane.

To find jobs on a job board

1. In the navigation area on the left, click **Boards**.

Make sure the navigation area is expanded (by clicking).

2. Select one of the boards in the navigation area, below the divider.

There are two types of boards listed below the divider: job boards and dashboards (only available if the Reporting Module is licensed). The board type is mentioned in the Manage boards dialog (which can be opened by clicking **+ Manage**). Boards displayed in white are owned by you, boards displayed in blue are shared boards (which cannot be edited by you).

The selected job board is shown to the right of the navigation area. The jobs are listed in columns. What is shown depends on the configuration of the board.

3. To reorganize the overview, click the **Group by** list field in the top right corner of the screen, and select the option of your choice (**Flow**, **Stage**, **State** or **None** (which removes any previous grouping).

   A group adds an extra level to a column.

   For example, suppose one of the columns of your board lists all problem jobs of all flows. With *'Group by' set to 'None'*, the jobs are put arbitrary one after the other. With *'Group by' set to 'Flow'*, the Problem jobs column is divided into different sections per flow, so you can easily see which problem job belongs to which job.

4. To search for a particular job for example to see if it reached a particular flow stage, enter (part of) the job name in the search field in the top right corner of the screen.

   The search is limited to the file name (name and extension).

5. To display recently finished jobs (by default, they are not shown), enter a value in the **Include jobs finished in the last x hours** field at the bottom of the job board.

5.4.5. Managing dashboards on the Switch Web Portal

5.4.5.1. About dashboards and widgets

As of Switch 2018 update 1, it is possible to create your own dashboards on the Switch Portal. This requires a license for the Reporting Module.

Dashboards on the Switch Web Portal can give you a quick overview of the *number of jobs* that are being processed by the Switch Server. You can for example display a counter (how many jobs failed, how many jobs are in a particular stage,...) or a graph with numbers per file type, flow,... It's also possible to visualize historical job data (e.g. number of problem jobs per week over the past 3 months).

The graphs and counters are actually **widgets** that can be configured at wish. The input for these widgets (i.e. the data that is visualized) comes from a job board. The widgets can be customized to a certain level: you can for example add a frame around a widget in the color of your choice, you can add a title, in case of a graph you have the choice between a bar, a donut or a pie chart,...

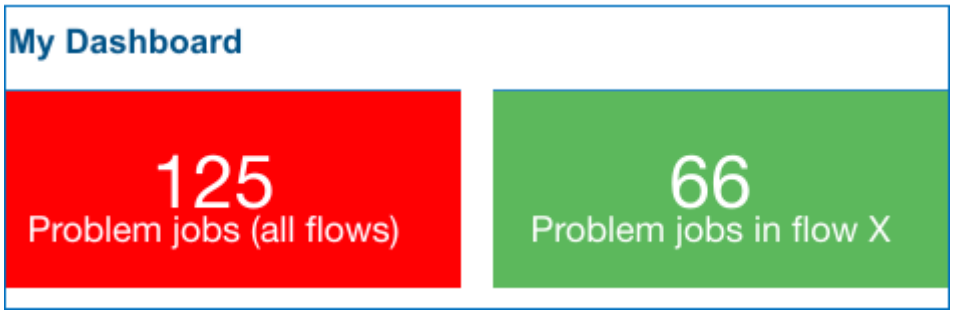
Currently, six different widgets are available for use on the Switch Web Portal. They are listed below.

Note: Access to job boards and dashboards is configured through the Users pane in Switch, hence it's possible that you don't have access to this functionality or that you can only view shared boards but not create new ones yourself.

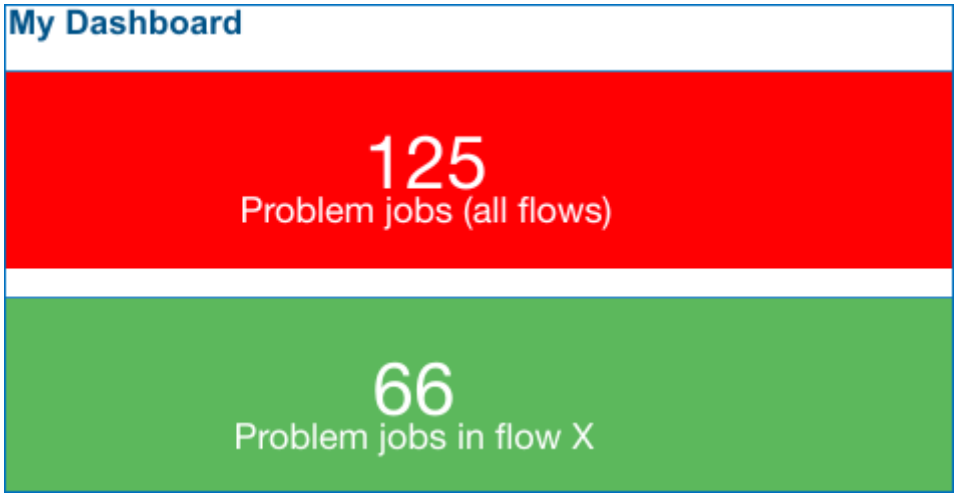
Column Layout

This is actually a layout that helps you position the widgets on the screen. You need it to put different widgets next to each other. If you want to put the widgets one after the other, in a vertical arrangement, you don't need a layout.

Example of 2 live counters in a column layout (horizontal arrangement):



Example of 2 live counters without column layout (vertical arrangement):



See also: *Dashboard widgets - Column Layout* on page 327

Custom HTML

This widget allows you to add a title, a logo, text and even a movie to your dashboard.

See also: *Dashboard widgets - Custom HTML* on page 328

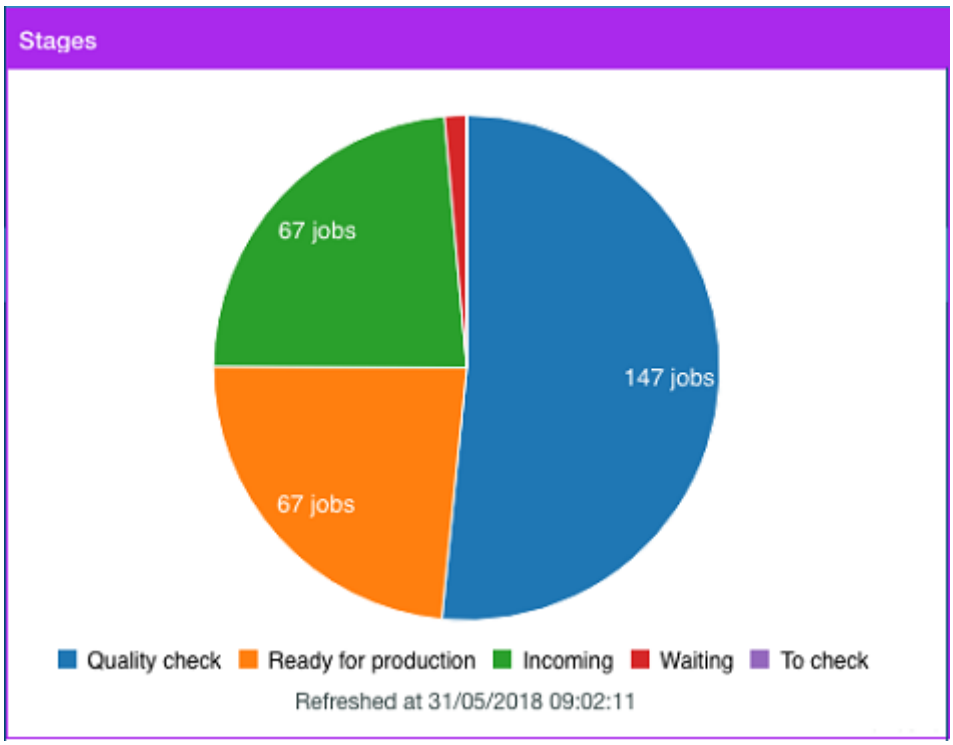
Live counter

This widget displays a number, representing the amount of jobs currently present on the selected job board.

See also: *Dashboard widgets - Live counter* on page 329

Live graph

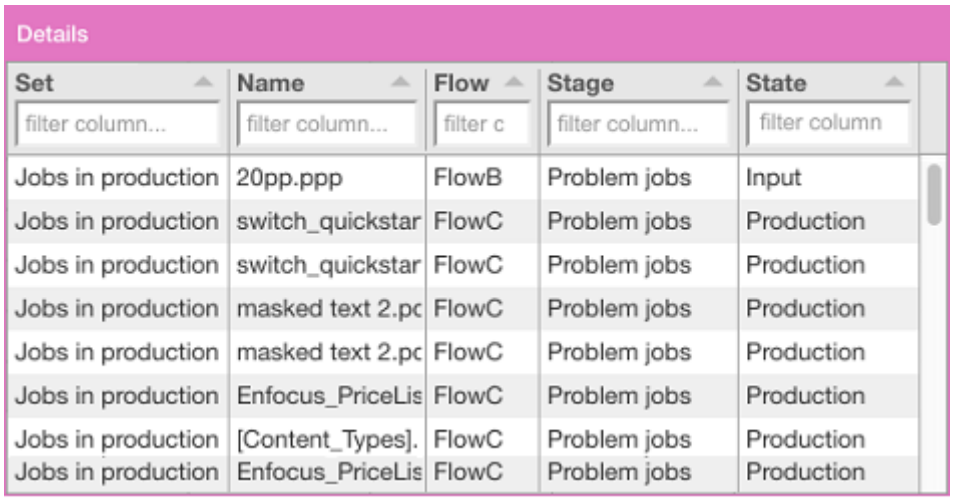
This widget counts both the total number of the jobs on the selected job board and the number of jobs per column, and presents this data as a graph.



See also: *Dashboard widgets - Live graph* on page 330

Live table

This widget displays **information about the jobs** counted in a live graph on the same dashboard. For example, if your graph gives an overview of the number of jobs per flow, the live table displays detailed information about these jobs (job name, flow name, stage and state of the job).



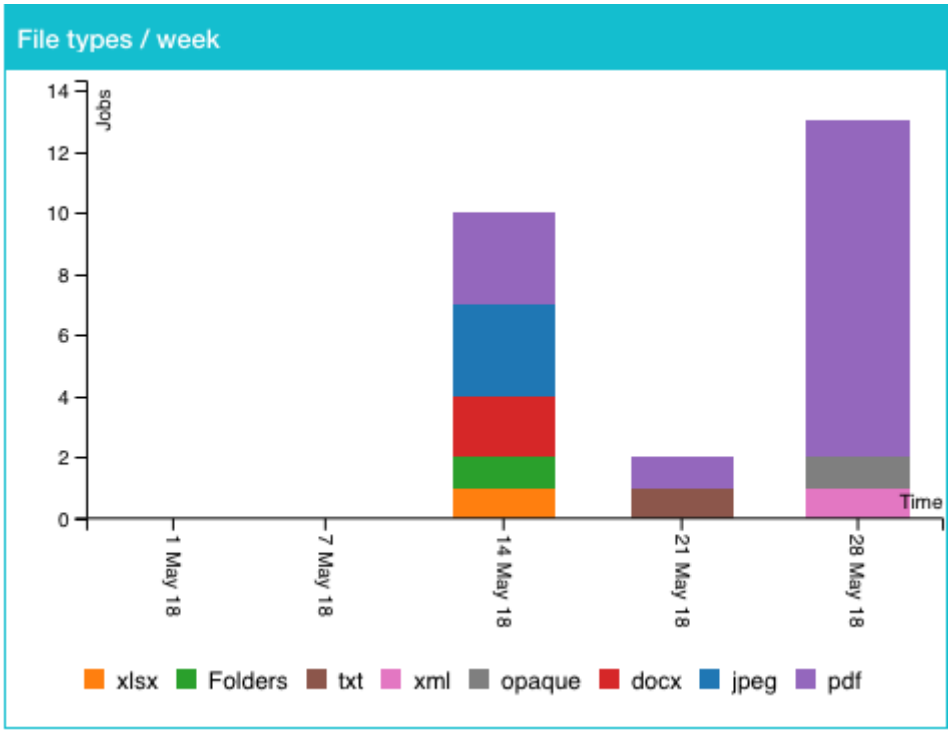
Details

Set	Name	Flow	Stage	State
filter column...	filter column...	filter c	filter column...	filter column
Jobs in production	20pp.ppp	FlowB	Problem jobs	Input
Jobs in production	switch_quickstar	FlowC	Problem jobs	Production
Jobs in production	switch_quickstar	FlowC	Problem jobs	Production
Jobs in production	masked text 2.pc	FlowC	Problem jobs	Production
Jobs in production	masked text 2.pc	FlowC	Problem jobs	Production
Jobs in production	Enfocus_PriceLis	FlowC	Problem jobs	Production
Jobs in production	[Content_Types].	FlowC	Problem jobs	Production
Jobs in production	Enfocus_PriceLis	FlowC	Problem jobs	Production

See also: *Dashboard widgets - Live table* on page 331

History graph

This widget visualizes the evolution of the number of jobs or the job size over a particular period of time, for example the total number of problem jobs of the last month, grouped by week.



See also: *Dashboard widgets - History graph* on page 332

5.4.5.2. Creating a dashboard

A dashboard is an overview screen with one or more widgets that visualize job data.

Before you start, make sure to *create a job board* with the data you want to display on the dashboard. Alternatively, you may use a shared job board. A job board to start from is necessary for all widgets, except for the history graphs and custom HTML. For example, if you want your dashboard to display the total number of problem jobs on the server, you need a job board that collects all problem jobs.

Note: Job boards are linked to your user account. Other users can't see them, unless you share them.

To create a dashboard

1. With the **Boards** view selected, click **+ Manage**.

   If you don't see + Manage, you may not have the permission to create boards.

   The **Manage boards** dialog appears.

2. In the bottom right corner of the dialog, click **New dashboard**.

   If you don't see the New dashboard button, you may not have the permission to create boards.

3. Configure your board:

   a. Enter a name for your board.

   b. Choose a layout:

- If you want to place the different widgets one below the other (**vertical arrangement**), you don't need a layout. If there is one on your dashboard (default configuration when creating a new board), click the remove button to remove it.
- If you want a **horizontal arrangement with two or more columns** next to each other, you need a column layout. If there is one on your dashboard (default configuration when creating a new board), click the edit button to configure it. Refer to *Dashboard widgets - Column Layout* on page 327.

c. Drag and drop one or more widgets onto the column of your choice (in case of a column layout) or directly onto the dashboard and configure them as required:

- *Dashboard widgets - Custom HTML* on page 328
- *Dashboard widgets - Live counter* on page 329
- *Dashboard widgets - Live graph* on page 330
- *Dashboard widgets - Live table* on page 331
- *Dashboard widgets - History graph* on page 332

d. To switch between configuration or edit mode and view mode:

- Click the edit button in the header of the widget to make changes.
- Click the view button in the header of the widget to view the result of your changes.

4. Click **Save**.
The dashboard is added to the navigation area.

Note that you can still make changes by clicking the edit button beside the name of the dashboard in the navigation area.

5.4.5.3. Managing a dashboard

This topic explains how to handle the custom dashboards on the Switch Web Portal.

Remember that dashboards are only available if the Reporting Module is licensed.

Proceed as follows:

1. In the navigation area on the left, click **Boards**.

Make sure the navigation area is expanded (by clicking).

2. Click **+ Manage**.
The **Manage boards** dialog appears. This dialog gives an overview of the boards you have access to. The grayed out boards are shared by other users; you can view them but not make any changes. The other boards are your own boards and are fully controlled by you.

3. Do one of the following as required:

To...	Do the following:
To create a new dashboard	Click **New dashboard** (blue button in the bottom right corner). See also *Creating a dashboard* on page 324.
To show or hide a dashboard in the navigation area	Click the slider in front of the dashboard you want to show or hide. If the slider is blue, the dashboard is visible in the sidebar. **Note:** This functionality is useful for dashboards you want to keep for later use.
To edit a dashboard	Click the edit button. **Note:** Alternatively, you can click the edit button beside the dashboard name in the navigation area. You can now add or remove widgets and make changes to the widgets as required: • To add a widget, click it (in the right part of the screen) and drag it onto the dashboard. • To remove a widget, click the remove button in the header of the widget. • To make changes to a widget, click the edit button in the header of the widget. • To view your changes, click the view button in the header of the widget. Do not forget to save your changes, by clicking the **Save** button (in the top left corner, next to the name of the dashboard). By saving your changes, you automatically switch to view mode.
To share a dashboard or to stop sharing it	Dashboards can be shared with other members of the same user group (as configured in Switch). To share or stop sharing, in the Sharing column of the board concerned: **1.** Click **Private/Shared**. **2.** In the dialog that pops up, select or clear the checkbox of the group(s) with whom you want to share your board. If no dialog pops up, you cannot share the board (for example because you're not configured as member of a group).

To...	Do the following:
	Note: Shared boards can only be viewed (not edited!) by other users.
To permanently remove a dashboard	Click the remove button. ✖

4. To save the changes made in the Manage jobs dialog, click **Apply**.

5.4.5.4. Viewing a dashboard

If you have the right permissions, you can create and view dashboards through the Switch Web Portal. The permissions are set by the Switch administrator through the Users pane.

To view your (earlier created or shared) dashboards on the Switch Web Portal

1. In the navigation area on the left, click **Boards**.

   Make sure the navigation area is expanded (by clicking).

2. Click one of the boards in the navigation area, below the divider.

   There are two types of boards listed below the divider: job boards and dashboards (only available if the Reporting Module is licensed). The board type is mentioned in the Manage boards dialog (which can be opened by clicking **+ Manage**). Boards displayed in white are your own boards, boards displayed in blue are shared boards (which cannot be edited by you).

   The dashboard is shown to the right of the navigation area. There may be several widgets present on the dashboard. Some of the widgets show extra information when hovering or clicking the legend. For more information, refer to the description of the widgets (*Dashboard widgets overview* on page 327).

5.4.5.5. Dashboard widgets overview

This is an overview of the widgets available for use on a Dashboard on the Switch Web Portal.

Dashboard widgets - Column Layout

About the Column Layout

The column layout is actually a layout, so not a graph or a counter. It allows you to place several widgets next to each other in columns, for a horizontal arrangement. If no column layout is chosen, the widgets will be placed one after the other, in a vertical arrangement.

How to configure the Column Layout

By default, two columns are available, but you can add more columns by switching to edit mode and clicking the button.

Note that you should first *configure* the column layout; afterwards (after having saved/having clicked the button) you can drag the widgets onto the layout.

Properties

Property	Description
Spacing	White space between two columns. You can enter a value expressed in the unit of your choice: px, em or % When using pixels or em, the size of the white space will be fixed; when using a percentage, the white space will adjust when the screen is resized. Note that this setting is optional and only needed when you want separate the widgets.
Columns with width settings	For each of the individual columns you can either define a **column width** or a **minimum and/or maximum width**. The width can be fixed (expressed in px or %) or "fit the content" (meaning that you let Switch decide which is the best size).
Show frame	When selected, a thin frame is drawn around the widget and the following additional properties are displayed:
Title	Text that will be shown in the title bar of the widget. You can leave it empty as required.
Frame color	Color that will be used for the title bar and the frame around the widget. Clicking the color patch will open a color picker dialog.

Dashboard widgets - Custom HTML

About the Custom HTML widget

This widget allows you to add text, tables, pictures, movies and links to your dashboard. You can use the text color and font of your choice, insert bullets, ...

How to configure the Custom HTML widget

You can type text in the text field and modify it using the tools in the editor.

An overview of shortcuts is available behind the question mark button. ?

Properties

Property	Description
Show frame	When selected, a thin frame is drawn around the widget and the following additional properties are displayed:
Title	Text that will be shown in the title bar of the widget. You can leave it empty as required.
Frame color	Color that will be used for the title bar and the frame around the widget. Clicking the color patch will open a color picker dialog.

Dashboard widgets - Live counter

About the Live counter widget

This widget displays a number, representing the amount of jobs currently present on the selected job board. Note that all jobs in all columns are taken together, resulting in one number, for example the number of problem jobs.

This number can be linked with a color, for example, if the number of jobs remains below a certain threshold, the background of the widget turns green; otherwise it turns orange or red.

The counter is updated at regular intervals (see properties), giving a live view on the Switch server.

How to configure the Live counter widget

You can configure the properties listed in the table below.

Properties

Property	Description
Job board	Data that will be used for the dashboard. 'None' is not a valid option.
Include jobs finished in the last (hours)	The value chosen here determines how long after finishing the jobs will be included in the live counter. If you enter '0', only jobs that are still moving through the flow and haven't reached an output folder will be included. If the widget doesn't behave as expected, contact your Switch administrator. There may be a conflict with the Keep internal job tickets for (hours) in the *Switch Application data preferences*.
Color	Background color of the widget based on the value of the counter. To change a value, click it and increase or decrease the value using the small arrow buttons. To change a color, click it to open the color picker and select the color of your choice. Note that there's also a small text field below the color patches. You can click it and type the text of your choice. This text will be displayed below the counter.
Refresh interval (in seconds)	This value indicates how often the number of jobs is recalculated.
Show frame	When selected, a thin frame is drawn around the widget and the following additional properties are displayed:
Title	Text that will be shown in the title bar of the widget. You can leave it empty as required.

Property	Description
Frame color	Color that will be used for the title bar and the frame around the widget. Clicking the color patch will open a color picker dialog.

Dashboard widgets - Live graph

About the Live graph widget

This widget counts both the total number of the jobs on the selected job board and the number of jobs per column, and presents this info in a graph.

Note that this requires a job board with more than one column; each column is represented as a separate section in the graph. You can choose between a pie, a bar and a donut chart.

How to configure the Live graph widget

You can configure the properties listed in the table below.

Properties

Property	Description
Chart	Type of chart to be used. Options are: • Pie • Donut • Bar **Tip:** Use "Pie" and "Donut" to show how the parts (i.e. values per column) compare to the whole (total number of jobs); use "Bar" to show how the parts compare to each other or to show trends.
Show grid lines	If selected, grid lines are shown to make it easier to read the values. **Note:** This option is not relevant (hence not available) for pie and donut charts.
Job board	Data that will be used for the dashboard. For this type of charts, you should have a board with more than one column. 'None' is not a valid option.
Include jobs finished in the last (hours)	The value chosen here determines how long after finishing the jobs will be included in the live graph. If you enter '0', only jobs that are still moving through the flow and haven't reached an output folder will be included. If the widget doesn't behave as expected, contact your Switch administrator. There maybe a conflict with the Keep internal job tickets for (hours) in the *Switch Application data preferences*.
Refresh interval (in seconds)	This value indicates how often the values are recalculated.

Property	Description
Show frame	When selected, a thin frame is drawn around the widget and the following additional properties are displayed:
Title	Text that will be shown in the title bar of the widget. You can leave it empty as required.
Frame color	Color that will be used for the title bar and the frame around the widget. Clicking the color patch will open a color picker dialog.

How to use Live graphs

Smaller parts are not always easy to read, so when **hovering over one particular part of the chart**, this part is highlighted and you get a small dialog with the column name and the percentage value of the highlighted part.

When **clicking an item in the legend**, the corresponding part of the chart is disabled (grayed out in the legend) and taken out of the chart. Clicking once more will bring it back.

Dashboard widgets - Live table

About the Live table widget

This widget displays **information about the jobs** counted in a live graph on the same dashboard. For example, if your graph gives an overview of the number of jobs per flow, the live table displays detailed information about these jobs (job name, flow name, stage and state of the job).

How to configure the Live table widget

You can configure the properties listed in the table below.

Properties

Property	Description
Parent	Live graph that is used as dataset for the live table. 'None' is not a valid option.
Show frame	When selected, a thin frame is drawn around the widget and the following additional properties are displayed:
Title	Text that will be shown in the title bar of the widget. You can leave it empty as required.
Frame color	Color that will be used for the title bar and the frame around the widget. Clicking the color patch will open a color picker dialog.

How to use live tables

To **see the details of a particular part/category in the chart**, e.g. one slice of the pie, just click in the chart. Only the details of the corresponding jobs will be shown in the table. Clicking once more will reset the table.

To **search for a particular job/a set of jobs**, you can filter the table by entering a key word in the filter fields below the column headers. Note that these filter fields are not case sensitive.

To **sort the list in ascending or descending order**, click the column header of the column by which you want to order it. Note that the small arrow in the column header will become a bit darker, to indicate this.

Dashboard widgets - History graph

About the History graph widget

A history graph **visualizes the evolution of the number of jobs or the job size over a particular period of time**, for example the total number of problem jobs of the last month, grouped by week. A further subdivision is possible, you can for example further group the jobs by file type, flow, stage or state.

Note that this graph only counts jobs that are completely finished, meaning that they have left the Switch flows. The maximum period of time to go back in the past is defined by the number of days set in the *Reporting preference*, for example for 120 days.

How to configure the History graph widget

You can configure the properties listed in the table below.

Properties

Property	Description
Chart	Type of chart to be used. Options are: • Line • Spline (curved line) • Bar • Pie
Show grid lines	If selected, grid lines are shown to make it easier to read the values. **Note:** This option is not relevant (hence not available) for pie charts.
Job board (single column only)	For the time being, only job boards with one column are supported. 'None' is a valid option for history graphs: if selected, all jobs on the Switch server are taken into account!
Unit	Determines what is counted and displayed: • Number of jobs • Total size
Group by	Determines how the values are grouped: • **None**: no grouping; the total number of jobs or the total size is mentioned. For example, 200 jobs on day1, 190 jobs on day 2, etc. • **Type**: the total number or the total size is further divided by file type. For example, 100 PDF files and 100 text files on day1, 90 PDF files and 100 text files on day2, ...

Property	Description
	• **Stage**: the total number or the total size is further divided by flow stage. For example, 75 jobs in stage1 and 125 in stage2 on day1, 70 in stage1 and 120 in stage2 on day2, ... **Note:** Stages that were not selected on the job board are not shown. • **State**: the total number or the total size is further divided by job state. For example, 33 jobs in state1 and 167 in state2 on day1, 22 in state1 and 168 in state2 on day2, ... • **Flow**: the total number or the total size is further divided by flow. For example, 50 jobs in flow1, 50 in flow2 and 100 in flow3 on day1, 99 in flow, 1 in flow2 and 90 in flow3 on day2, ... **Note:** Flows that were not selected on the job board are not shown. • **Element**: the total number or the total size is further divided by flow element. For example, 2 jobs have been put in the recycle bin, 7 jobs have been processed by the Enfocus PitStop Server configurator, ... Note that all elements in all flows are taken together, regardless of the name of the instance in the flows. For example, even if the recycle bins in your flows are called 'Trash1', 'Trash2', Trash3', in the graph you'll see 1 flow element 'recycle bin' (with all jobs collected in all 3 trash folders). As for the folder element: only input folders are taken into account. Intermediate and output folders nor problem folders are represented in the graph.
Period	Determines how the data will be grouped, i.e. which data will be taken together. • Day • Week • Month For example, if grouped by week, you'll get one value for all jobs of a particular week (optionally further divided by flow, file type, etc.) **Note:** This field is not available if the 'Pie' chart is chosen.
Days previously	Refers to the time period that will be shown in the graph. For example, if set to '200', the data of the last 200 days (= today minus 200 days) will be shown. Note that the maximum number of days that is possible is determined by the Reporting preference (see higher).
Show frame	When selected, a thin frame is drawn around the widget and the following additional properties are displayed:
Title	Text that will be shown in the title bar of the widget. You can leave it empty as required.

Property	Description
Frame color	Color that will be used for the title bar and the frame around the widget. Clicking the color patch will open a color picker dialog.

How to use history graphs

Smaller parts are not always easy to read, so when **hovering over one particular part of the chart**, this part is highlighted and you get a small dialog with more information (for example the number of jobs/the total size per group; if there is no grouping, the dialog mentions the "overall" value).

When **clicking an item in the legend**, the corresponding part of the chart is disabled (grayed out in the legend) and taken out of the chart. Clicking once more will bring it back.

5.4.6. Submitting and checking jobs through the Switch Web Portal

Submitting and checking jobs through the Switch Web Portal is only possible if you have licensed the **SwitchClient Module (2017 or higher)** and you're using the new, **web-based version** of the client. In that case, the *job client type* option (in the Internal Communications preferences) must be set to *Default*.

Overview

An active SwitchClient Module gives access to the following functionality:

- Connect to one or more Switch Servers on the local network/internet.
- Submit jobs (files or job folders) and metadata describing these jobs to a Submit point in a flow.
- Review and act on jobs being held in a Checkpoint in a flow.
- View progress information and the status of submitted jobs.
- View log messages issued by processes on the server.

Good to know

- Access to particular Submit points and Checkpoints can be restricted, by configuring access rights at user or user group level.
- Metadata information attached to a job can be used to make automated routing decisions or to provide variable input to various tools and configurators.
- If you want to connect to more than one Switch Server at a time, you must open a browser window per server and sign in to the Switch Web Portal for each server separately. The IP address of the server is displayed in the URL.

5.4.6.1. Setup in Switch

Allowing users to submit and check jobs via the Switch Web Portal, requires **some preparation in Switch**, usually done by a system administrator.

This includes:

- Installing and activating Switch (this includes activating the SwitchClient Module)

- Designing and activating one or more flows that will process the jobs submitted and monitored through the Switch Web Portal.
- Configuring user access rights (in the Users pane)
- Configuring or checking the communication settings (through the Switch user Preferences)

Installing and activating Switch and the SwitchClient Module

Licenses

A regular SwitchClient Module includes a license for **up to five concurrent connections**. If this is not sufficient, you can purchase additional licenses. The number of licenses can be raised by entering a new activation key in the **Manage licenses** dialog in Switch.

An active SwitchClient Module allows you access to the following flow elements:

- Submit point
- Checkpoint
- Checkpoint via mail

If SwitchClient is not licensed, the above flow elements will not be available and you will not be able to submit and check jobs through the Switch Web Portal.

Remark: To avoid misuse, we allow 200 submits per licensed client connection per hour. For most customers this will be enough. If this is not the case (e.g. you get the following warning: "You reached the maximum number of calls"), please consider buying additional SwitchClient licenses or a Web Services license (unlimited number of users).

How to proceed

Follow the guidelines and instructions described in the chapter on installing, activating and starting Switch. :

1. Install Switch.
2. Activate Switch, including the SwitchClient Module.
3. Activate additional licenses if required.

Designing flows for use with the Switch Web Portal

Managing files through the Switch Web Portal requires a particular flow design in Switch.

About flows in Switch

To design a flow, the Switch user drags flow elements (such as Submit points, processors and folders) on the canvas and connects them according to the desired job flow. After configuring appropriate property values for each flow element (and in some cases, the connections), the Switch user can activate the flow for execution. From then on, Switch automatically moves and processes jobs along the flow.

If you're new to Switch, we recommend having a look at the Switch Quick Start Guide (available on the *Enfocus website*).

Dedicated flow elements

Submit points and **Checkpoints** are flow elements designed for use with the Switch Web Portal. For more information, refer to the description under Flow elements: overview > Communication.

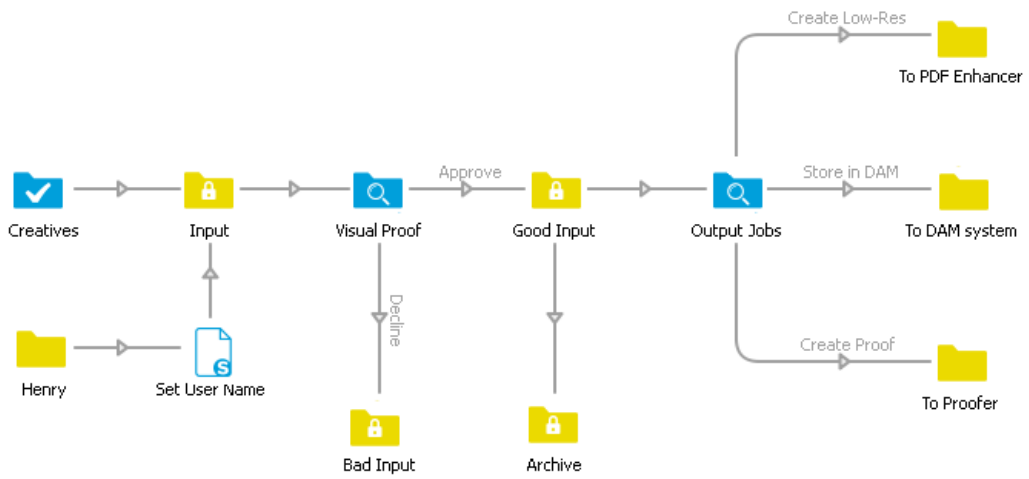
Note:

- Make sure the **flows you want to use with the Switch Web Portal are active**. A user with the appropriate access rights can *access* Submit points, Checkpoints and jobs in inactive flows but the jobs will not move along the flow.

- **The Switch Web Portal only interacts with the Switch Server**, not with the Switch Designer. Users can safely quit the Designer without disturbing the operations via the Portal as long as the Switch Server is running. For more info on the behavior of Switch when exiting the flow designer, refer to the Switch user preferences (User interface).

Example flow

Here's a flow example as it is shown on the Switch canvas:



Since this example focuses on Web Portal features, there is a lot of interaction with human operators and little automated processing (other than moving jobs around). Real-life flows would probably include processing steps such as preflight or color conversion.

The **Submit point on the left** (*Creatives*) allows submitting jobs to the flow in a controlled way using the Switch Web Portal. The user's name is automatically remembered; multiple users can use the same Submit point since each user is identified to Switch through his/her user name and password. The "Set User Name" script serves to add a user name for jobs submitted through a regular hot folder (Henry).

The **first Checkpoint** (*Visual Proof*) holds the incoming jobs for inspection by a user through the Switch Web Portal. The user will see the names of the output connections (Approve and Decline) as buttons in the job card. Pressing one of these buttons moves a job along the corresponding connection.

The **second Checkpoint** (*Output Jobs*) allows a Switch Web Portal user to decide how the jobs will be stored or processed. This Checkpoint is configured to allow multiple outputs at the same time; for example both "Store in DAM" and "Create Proof".

Setting up a Submit point

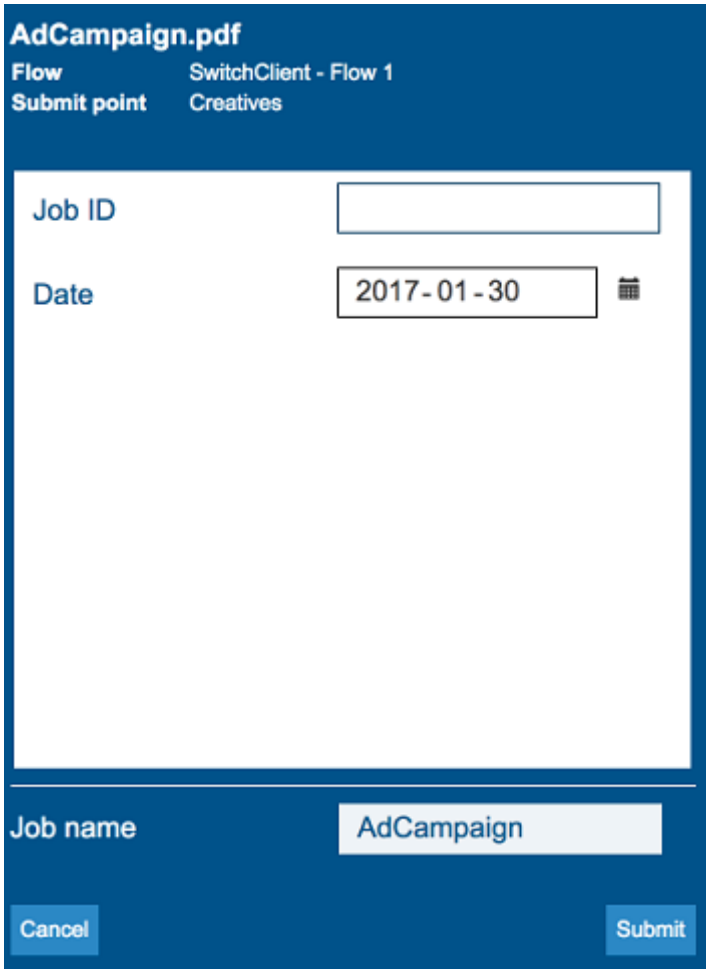
When setting up a Submit point (*Creatives* in the example flow), you can configure it in such a way that the user must enter one or more data fields before submitting a job to this Submit point. The entered values are associated with the job as metadata.

To enable this option, in the properties of the Submit point element:

1. Set **Enter metadata** to **Yes**.
2. Double-click the **Metadata fields** property and define the metadata fields for which the user should provide a value, for example a Job ID and the date of submission.
3. The **Dataset name** field is completed automatically. This is the name of the dataset that will be created containing the contents of the metadata fields entered by the user.

   For a full description, refer to 'Defining metadata fields'.

The following screenshot shows how a user will have to enter the data (Job ID and Date) configured in the Submit point.



Setting up a Checkpoint

Similarly, when setting up a Checkpoint (*Visual Proof* and *Output Jobs* in the example flow), you can ask Switch to display additional information about the job, and the user may be asked to

enter additional data fields before acknowledging a job. (This is the case if the **Enter and display metadata** property is set).

Furthermore, the **output connections of the Checkpoint determine which buttons will be shown** to the user for acknowledging a job.

For example, the *Visual Proof* Checkpoint in the example flow is configured in such a way that the user will see two radio buttons ('Decline' and 'Approve', named after the connections); clicking one of the buttons causes the job to move along the corresponding connection. This is the default behavior of a Checkpoint if two output connections are defined and no metadata has been enabled.

On the other hand, the *Output Jobs* Checkpoint in the example flow is configured in such a way that the user can select **more than one option**, causing a duplicate of the job to be sent out over each of those connections. This is possible if the **Allow multiple outputs** property is enabled.

In this example, the user that has to review the files will see 3 checkboxes (the names come from the output connections in Switch) and can select one, two, or three checkboxes as required.

For an overview of all properties, refer to the description of the Checkpoint flow element.

Metadata in Submit points and Checkpoints - default values

When defining the default values for the metadata fields, you can use a number of variables that automatically retrieve information from the computer that is used to submit or check jobs. As a consequence, this information does not need to be entered explicitly by the user; it can even be sent along with the job without being displayed.

The variables concerned are the so-called Connection variables:

- [Connection.Email]
- [Connection.FullUserName]
- [Connection.IP]
- [Connection.UserName]

If you use those as default values for your metadata fields, they will be replaced automatically with their actual values.

To make this happen, "bidirectional communication" is established between Switch and the Switch Web Portal:

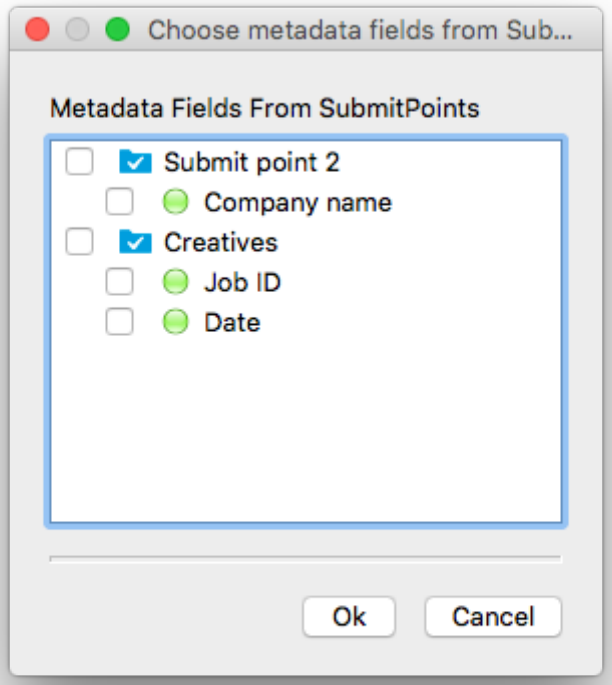
1. The Switch Web Portal requests the default value of the metadata fields, being a connection variable.
2. Switch Server sends the connection variable e.g. [Connection.IP] to the Portal.
3. The Portal replaces the variable with its actual value and sends the actual value along with the job back to Switch Server.

Use case: To keep track of the clients used to submits jobs, you could configure a metadata field "IP address" and set the default to [Connection.IP]. When a file is submitted, the IP address of the system used to submit this file is entered automatically and sent along with the job. It depends on the metadata field properties whether or not this field (with the actual value) is shown to the user and whether or not it can be changed.

Re-using metadata fields from a Submit point in a Checkpoint

Switch provides an easy way to re-use the metadata fields defined for Submit points in a particular Checkpoint.

To re-use an existing metadata field, simply click the button (instead of the green plus button) in the Define metadata fields dialog. This will open a dialog like the one shown below.

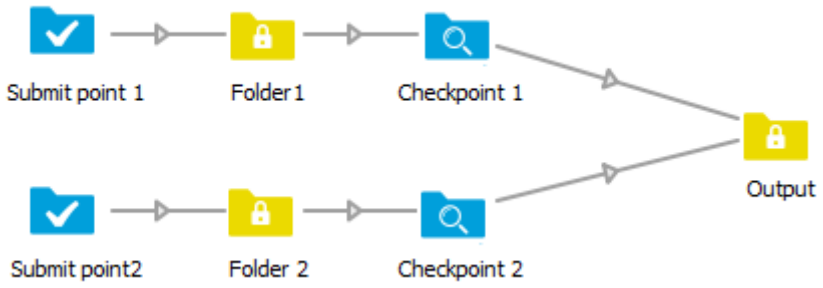


You can now select the metadata fields you want to re-use (based on the Submit points defined for the current flow). Note that the added metadata fields have only two editable options: **Read only** (yes/no) and **Display metadata field** (yes/no). The other options are grayed out and cannot be changed.

Remark: Although all Submit points present in the flow are shown, you must keep in mind that only the Submit point that is used for the job will send metadata. Refer to the example below: since all jobs in Checkpoint 1 come from Submit point 1, it does not make sense to add metadata from Submit point 2 to Checkpoint 1 (and vice versa).

If configured incorrectly, the connection variables (if used) will not be replaced with the actual values (users will see e.g. [Connection.UserName]) and metadata fields for which there is no value entered will be blank.

If configured correctly, when checking the Alert job on the Portal, the connection variables (if used) will be replaced with the actual values (e.g. EAW13DL399 instead of the [Connection.IP]) and the metadata fields that were completed at the time of submission will show the entered data.



Configuring user access

How to proceed

Follow the guidelines and instructions described in the chapter "Configuring Switch users". :

1. Set up the appropriate users and configure their user name, password, email address,...
2. Give them access to the appropriate Submit points and Checkpoints.

Configuring the communication settings

To configure the communication settings for communication with the Switch Web Portal

1. Navigate to:
   - On Windows: **Edit** > **Preferences**.
   - On Mac OS: **Enfocus Switch** > **Preferences**.

   The User preferences dialog appears.
2. In the left part of the dialog, click **Internal communication**.
3. Make sure that **Job client type** is set to **Default**.

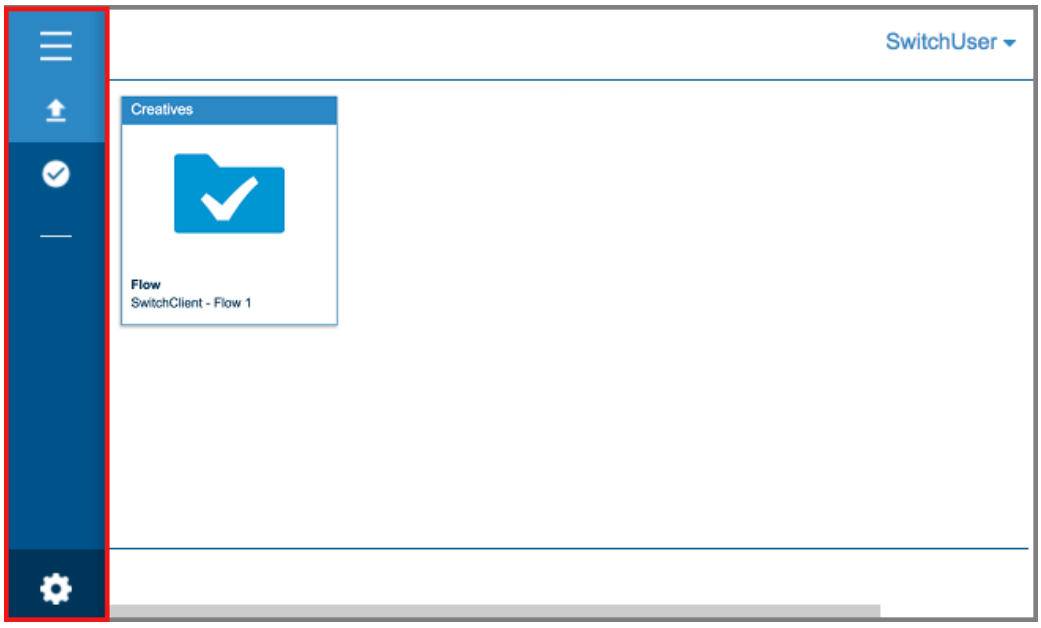
   This indicates that you're using the new web-based client instead of the old SwitchClient desktop application.
4. In the left part of the dialog, click the **Web services** category.
5. Make sure the **Port for the Switch Web Portal** preference is set to 51089, unless there is a good reason to change it.

6. Click **OK**.

5.4.6.2. The Switch Web Portal User Interface

The navigation area

When opening the Switch Web Portal, you can access the functionality to submit and check jobs through the navigation area in the left part of the screen. This area can be collapsed or expanded; when collapsed (see screenshot), the icons remain visible allowing you to switch to the appropriate view. The view that is active is highlighted; in this example, that is the Submit jobs view.



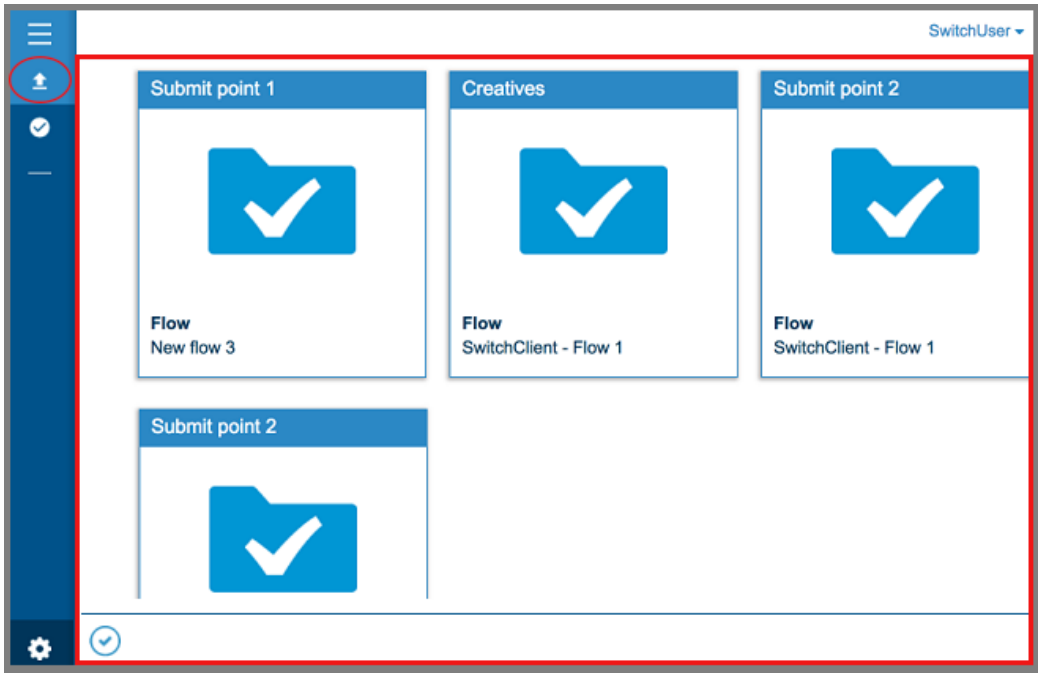
The table below explains the meaning of the buttons in the navigation area.

Button	Click this button to...
	Expand or collapse the menu.
	Display the Submit jobs view.
	Display the Check jobs view.
	Find more info. A new dialog is opened with links to: • The Switch documentation on the website • The Enfocus Support Portal (to report a problem) • The Support page on the Enfocus website • The Switch system requirements.

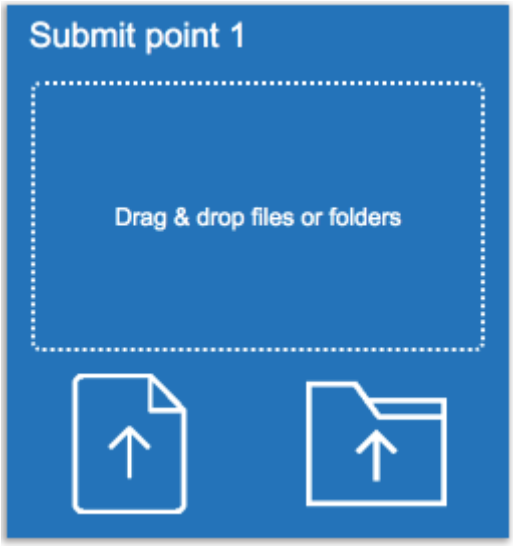
Note: Depending on your permissions, you may see two extra buttons in the navigation area, giving access to the log messages and the boards. For more information, refer to *Finding Switch jobs through the Switch Web Portal* on page 316, *Managing dashboards on the Switch Web Portal* on page 320 and *Viewing log messages through the Switch Web Portal* on page 309.

Submit jobs view

The Submit jobs view allows you to submit Jobs to the Switch Server. You can see all Submit points that you have access to, based on your permissions (as set in the Users pane in Switch).



When you hover over a Submit point, it changes as shown on the screenshot:



The upper area is the 'drag and drop' area; the lower area consist of two buttons, which allow you to browse to the files you need. The first button should be used to submit *files*, the second one to submit *folders*.

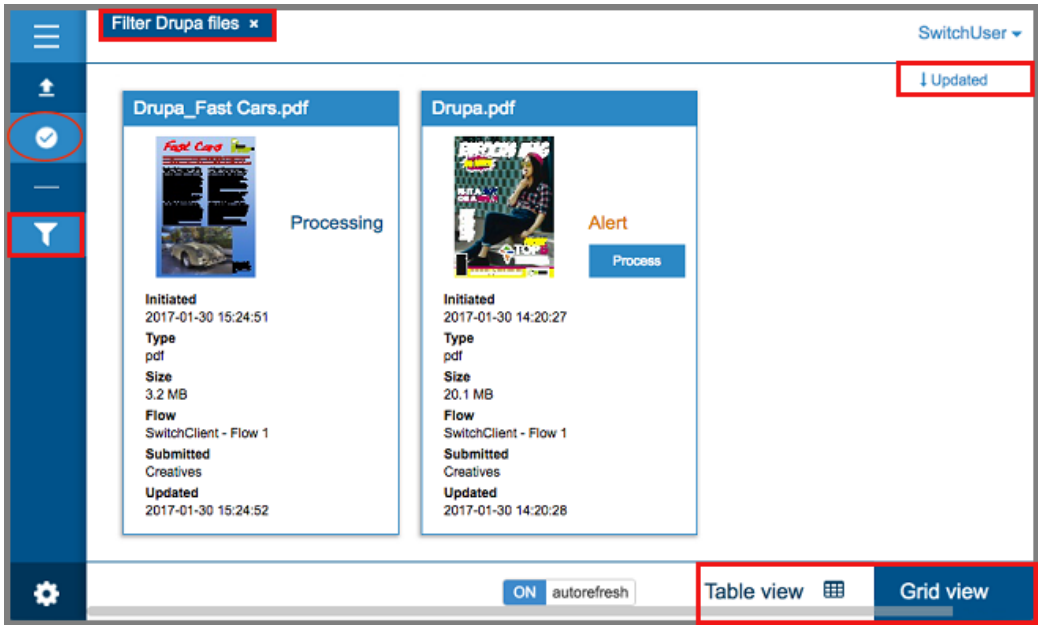
Once you have submitted a job, you will see one of the following icons at the bottom of the screen:

Icon	Meaning
	Indicates that a job is being uploaded. You can click it to see the percentage of completion.
	Indicates that the jobs that were submitted in the current session were uploaded successfully. You can click the icon to see which jobs were uploaded.

Check jobs view

This view allows you to view jobs submitted through a Submit point on the Switch Web Portal, and to check and route jobs waiting in a Checkpoint.

It depends on your user permissions (set in the Users pane in Switch) which jobs you can see and/or further process.



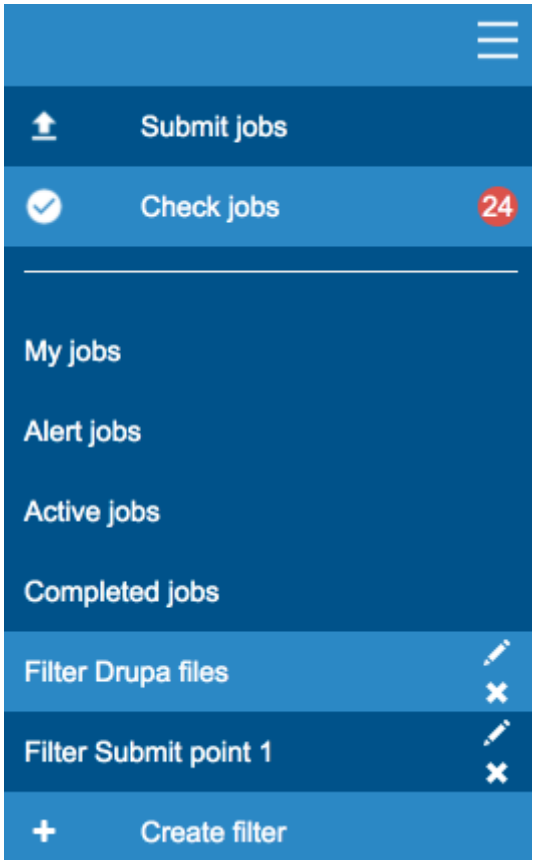
This view has a couple of extra buttons:

Button	Meaning
	Click this button to manage the filters that allow you to only display a *subset* of the jobs that you have access to. When you click this button, the navigation area expands automatically, so you can see the pre-configured filters (My jobs, Alert jobs, Active jobs, Completed jobs) and the ones you have created yourself (see screenshot below).
Filter Drupa files ×	The label in the upper part of the overview refers to the *custom* filter that is currently applied. If you want to stop filtering based upon that filter, you can click the cross icon. Note that *pre-configured* filters are not marked by a label when they are applied. You can see that they are applied, when they are highlighted in the navigation area.
Updated	This button allows you to change the sort order of the jobs in the overview. In this example, the jobs are sorted in descending order (arrow down) by the date they were last updated (= value of the field "Updated").
Table view Grid view	This button allows you to Switch between table view and grid view (as on the screenshot): • In table view, every row represents a job; the job details are shown in the different columns.

Button	Meaning
	• In grid view, every job card represents a job; the job details are listed on this card.

Filters
This is an example of how the navigation area looks when expanded.

The filter that is applied ("Filter Drupa files" in this example) is highlighted.



Note the counter next to 'Check jobs'. It indicates the number of "alert" jobs waiting to be processed.

5.4.6.3. Submitting jobs through the Switch Web Portal

It is possible to submit single files or multiple files, or files contained in a folder (for example a page layout with its accompanying images and fonts or the individual pages in a book). A job folder may contain nested subfolders (which can contain other files and folders, recursively).

If the files are contained in a folder, they will be considered as one job with one dataset; it will not be possible to enter metadata for each file separately.

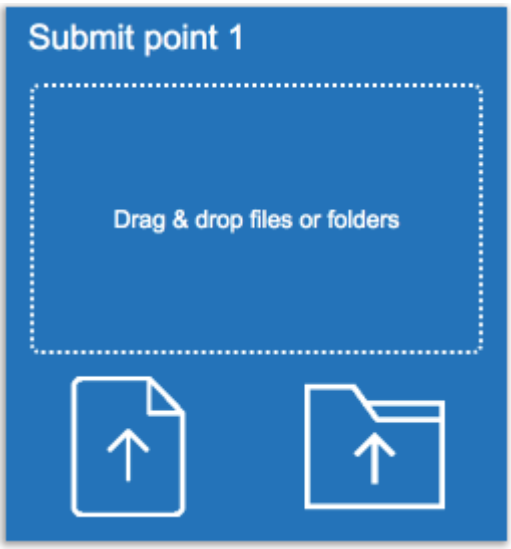
Note: Remember that the Switch Server must be running and that the Switch flow must be activated. Otherwise, the jobs will not be processed.

To submit a job to a particular Submit point:

1. In the Switch Web Portal, in the navigation area, click **Submit jobs**.
   You can see the Submit points you have access to.

2. Do one of the following:

   - "Drag and drop" the file(s) or folder(s) you want to submit onto the Submit point of your choice. Make sure the files are dropped on the upper part (drag & drop area).
   - Hover over the Submit point of your choice, and click the appropriate button in the lower part. The first button is to be used for files, the second for folders. You can then browse to the files or folders you need and select them.



   To select multiple files or folder, hold down the **Ctrl** key while selecting.

3. *If you have selected several files*, you must first decide if you want to process them as **separate jobs** or as **one job**. Click the button of your choice.

   If you choose to process them as one job, the files will be submitted to and moved along the flow as a single entity.

4. *If the Submit point has been configured to request additional information about the job* ("metadata"), you'll get a dialog with one or more entry fields. Enter the requested information.

5. Change the job name as required.

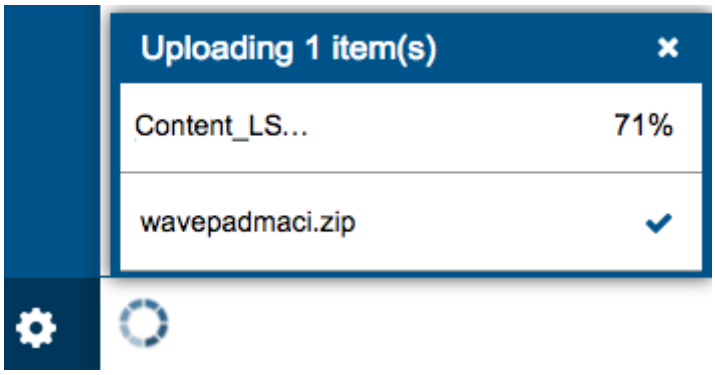
   The chosen job name will replace the file name. For example, if the job name is "testjob", the job file "customerX.pdf " will be renamed "testjob.pdf". The file extension remains the same.

   In case of a job folder, the job name will replace the name of the folder. The files contained in this folder will not be renamed.

   In case of multiple files being submitted in one go, you cannot enter a job name, unless you have chosen to process them as one job; in that case, they are put in a folder and the chosen job name will be the folder name.

6. Click **Submit**.

Note that there is a progress indicator at the bottom of the screen. If you click the icon, you can see which files have been submitted successfully, and/or which are still uploading.



5.4.6.4. Viewing jobs through the Switch Web Portal

To view Switch jobs through the Switch Web Portal

1. In the Switch Web Portal, in the navigation area, click **Check jobs**.
   You can see all jobs you are allowed to see based on your user permissions (set in the Switch Users pane). The counter (only shown if the menu is expanded) indicates the number of files waiting in a Checkpoint.

2. To view only a particular set of jobs, apply a filter.

   Make sure the navigation area is expanded (by clicking or).

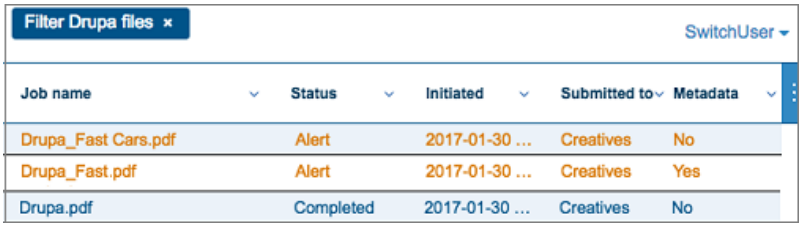
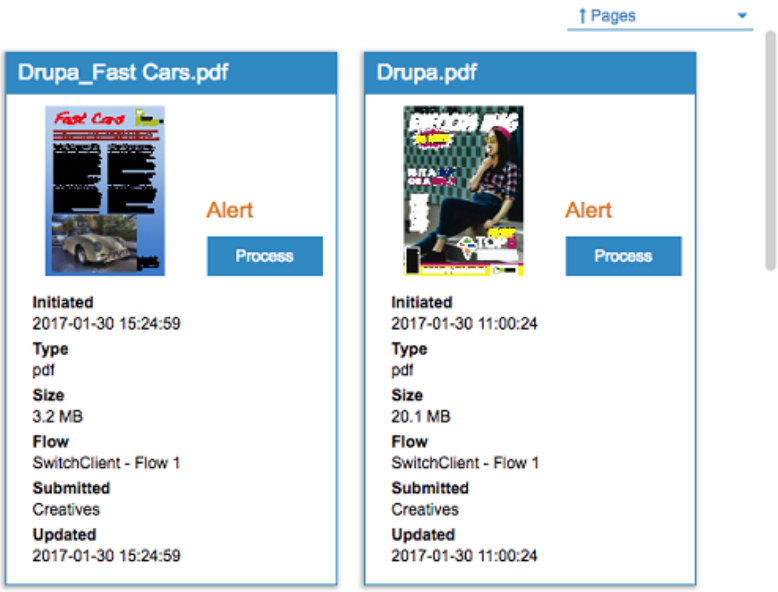
   - Click one of the pre-configured filters in the navigation area below **Check jobs**, for example 'My jobs'. Refer to *Job filters* on page 349.
   - Create a filter yourself. Refer to *Creating a custom filter* on page 350.

   The jobs matching the selected filter (now highlighted in the navigation area) are shown. If you don't see the jobs you expected to see, check if:

   - The Switch Server is running.
   - The information displayed is up-to-date. Refresh your browser window to update the information from the Switch Server.

   Note that you can stop filtering by clicking the filter name in the navigation area once more. Alternatively, in case of a custom filter, you can create the cross icon in the *label* (shown in the upper part of the overview).

3. To view the jobs presented in a different way, click the table view or the grid view button at the bottom of the screen.

View	Example
Table	 Table-specific options: • To hide a column, click the icon in the top right corner and clear the checkbox of the column you want to hide. Note that you can go back to the default view (and column size/position) via the Refresh columns option at the bottom of this list. • To move the columns, drag them sideways. • To sort the overview, click the header of the column you want to use to sort the overview and click the order of your choice (A-Z or Z-A).
Grid view	

4. To view the details of a job and eventually review and process the job:
   - In table view, click the row concerned.
   - In grid view, click the **Process** button of the job you want to check and/or process.

   See also: *Reviewing and processing jobs through the Switch Web Portal* on page 352.

Job statuses

The following table gives an overview of the statuses a job can have on the Switch Web Portal.

Status	Meaning
Processing	The job resides somewhere in the flow but not in a Checkpoint, and it is not finished yet. This includes jobs in the Problem jobs flow element.
Alert	The job resides in a Checkpoint and is waiting for intervention by an operator. The number of alert jobs is indicated by a counter in the navigation area of the Web Portal.
Error	The job failed. You should contact your system administrator for more information.
Completed	The job has been processed and has arrived in the output folder of the flow.

Job filters

Default job filters

The table below provides an overview of the default, pre-configured filters in the Check jobs view on the Switch Web Portal.

Filter	Displays:
My Jobs	All jobs submitted by you, i.e. the current user, regardless of their current status (processing, alert, completed).
Alert Jobs	All jobs waiting in a Checkpoint. **Note:** You can only see the jobs in a Checkpoint that you are allowed to access (as configured in the Users pane in Switch).
Active Jobs	All jobs that are somewhere in the flow, but not in an end folder (that is, not yet completed). This includes files that reside in the Problem jobs folder. **Note:** This only applies to jobs that are visible to you.
Completed Jobs	Displays all the jobs that reside in an end folder in Switch. **Note:** This only applies to jobs that are visible to you.

Custom job filters

You can as well create your own filters, for example you can create a filter to display all jobs in a particular Submit point or Checkpoint, all jobs with a particular status, all jobs initiated before or after a particular time, etc.

Refer to *Creating a custom filter* on page 350.

Note that these filters are not visible to other Switch users signing in to the Switch Web Portal.

No filter applied

If no filter is applied, you can see all jobs you are allowed to manage.

Creating a custom filter

In the Check jobs view on the Switch Web Portal, you can create your own, custom filters.

You could for example create a filter that displays all jobs with a certain status that were submitted to a particular Submit point.

To create a custom filter

1. Do one of the following:
   - In the navigation area, click **+ Create filter**.
   - Click in the upper part of the screen on "Create filter".
2. In the dialog that pops up, beside the **Close** button, enter a meaningful name for the custom filter.

   Each filter needs to have a unique name.
3. Configure a filter rule: select the appropriate filter field, choose an operator and enter the value of your choice.

   Example filter fields are: Checkpoint, On alert since, Files, Flow, ... "Familystarter" refers to the first job in a job family, being a set of jobs that have been generated from the same original job. For example, a PDF, its Preflight Report, the preflighted and the low res version, ... they all belong to the same job family.
4. To configure a second rule or rule set, click the appropriate button:
   - To add one rule, click the green **Add rule** button.
   - To add several rules, which are related to each other (through an AND/OR relation), click the green **Add group** button.

   If you have made a mistake, you can remove the rule concerned by clicking the red **Delete** button.
5. Once you have configured your rules, make sure to indicate the relation between the rules and the rule groups, by clicking the appropriate button:
   - And means that for each job it is checked if all rules apply. For example, with *Checkpoint = Checkpoint 1 AND job status = alert* only the jobs in Checkpoint 1 that have the alert status will be shown.
   - Or means that at least one of the rules should apply. For example, with *Checkpoint = Checkpoint 1 OR job status = alert*, all jobs in Checkpoint 1 are shown (regardless of their status) and all jobs that have the alert status (regardless of the Checkpoint they are in).

   The And/Or option is only relevant if you're configuring more than one rule.

The following example results in a list of jobs submitted to Submit point 1 AND having a certain status, which can be either Alert OR Error.

6. If required, repeat step 5 until you have configured all rules you need.
7. Click **Apply** or **Apply and save** as required.

The newly created filter is displayed in the blue navigation area on the left and in the upper part of the screen as a blue label. The label indicates that the filter is applied; to stop filtering the jobs, simply click the cross icon in the label. The filter remains available for later use in the navigation area.

Managing custom filters

This topic explains how to handle the **custom** filters in the Check jobs view on the Switch Web Portal.

The filters are listed in the blue navigation area below the pre-configured filters.

- To create a new filter, in the blue navigation area, click **+ Create filter**.

  Refer to *Creating a custom filter* on page 350.
- To edit a custom filter, click the pencil button beside the filter name.

  Refer to *Creating a custom filter* on page 350.
- To apply a filter, simply click the filter name in the blue navigation area. The filter will be applied immediately, and you'll see the filter name appear in a blue label just above the jobs overview.
- To stop applying a filter, click the filter name once more (so it's no longer highlighted) or click the cross button in the label.

- To remove a custom filter permanently, in the navigation area, click the cross button beside the filter name.

5.4.6.5. Reviewing and processing jobs through the Switch Web Portal

Checkpoints are intermediate folders in a flow where jobs that arrive are being held until they are reviewed by an operator. Once reviewed, the operator indicates how they should move along the flow.

You can review these jobs one by one, or in batch as described below.

Processing one job at a time

To review a job being held in a Checkpoint:

1. In the Switch Web Portal, click to expand the navigation area as required.
2. In the navigation area, click **Check jobs**.
   All jobs that you have access to, regardless of their status, are displayed in the overview. The counter indicates the number of jobs that are waiting in a Checkpoint, so all jobs with the 'alert' status.
3. Click **Alert jobs**.
   This is a pre-configured filter.
   The selected filter is highlighted in the navigation area and applied immediately. In the overview, you will see all jobs that arrive in the Checkpoints you have access to. Remember that you can switch between table and grid view as required (buttons at the bottom of the screen).
4. Select the job you want to review and route:
   - In table view: Double-click the job concerned.
   - In grid view: In the job card of the job concerned, click the **Process** button.

   A dialog opens and displays more detailed information about the selected job.
5. Review the job as required, using the buttons in the top left corner of the dialog.
   For an overview, refer to *Review options* on page 354.
6. Enter extra info ("metadata") if requested.
   This depends on the setup in Switch.

   Note: If you entered metadata before locking or replacing a job, you will be requested to enter it again.
7. Route the job:
   - If you see radio buttons, choose one of the options.
   - If you see checkboxes, you can select more than one option if appropriate.
8. Click **Push**.

The dialog is closed automatically. The job will move along the chosen connection(s) in Switch. The job status will change over 'processing' to 'completed', so it will no longer be present in the Alert jobs overview.

Processing multiple jobs as one

This topic explains how you can process a number of alert jobs in one go.

Note that this is only possible for:

- Alert jobs waiting in the same Checkpoint,
- Which all need to be moved along the same output connection,
- With the same metadata values.

To process multiple jobs proceed as follows:

1. In the Switch Web Portal, click to expand the navigation area as required.
2. In the navigation area, click **Check jobs**.
   All jobs that you have access to, regardless of their status, are displayed in the overview. The counter indicates the number of jobs that are waiting in a Checkpoint, so all jobs with the 'alert' status.
3. Click **Alert jobs**.
   This is a pre-configured filter.
   The selected filter is highlighted in the navigation area and applied immediately. In the overview, you will see all jobs that arrive in the Checkpoints you have access to. Remember that you can switch between table and grid view as required (buttons at the bottom of the screen).
4. In the Check jobs area, with the Alert jobs filter selected, click the checkboxes of the jobs you want to combine.
   In grid view, the checkboxes become visible when you hover over the job cards. As soon as you have selected a job, the jobs waiting in a different Checkpoint are grayed out, because you can only combine jobs that are waiting in the same Checkpoint.
5. Click **Process multiple** in the bottom right corner of the screen.
   The number of jobs contained in the selection is shown.
6. To review the jobs one by one, use the arrows in the top left corner to navigate between them.
   For more information about the buttons, refer to *Review options* on page 354.
7. Enter extra info ("metadata") if requested.
   This depends on the setup in Switch. The metadata value should be valid for all jobs in the selection; it's not possible to have a different value per job file.
8. Route the job:
   - If you see radio buttons, choose one of the options.
   - If you see checkboxes, you can select more than one option if appropriate.

   Note that your choice applies to all jobs in the selection.

9. Click **Push**.
   The dialog is closed automatically. The jobs will move along the chosen connection(s) in Switch. The job status will change over 'processing' to 'completed', so it will no longer be present in the Alert jobs overview.

Review options

This is an overview of the buttons that are available when you're reviewing a job that is held in a Checkpoint.

Some of the buttons may be missing; this depends on the setup in Switch. For example, if editing or report viewing are not allowed, these buttons do not show up.

Option	Meaning
View	Allows you to view the job file(s). The job is opened in the browser, if the browser supports the job's file type (e.g. PDF, JPEG). If the browser cannot open the file and also in case of a job folder, you will be asked to save the file(s) or folder locally, or they will be downloaded. The behavior depends on your browser settings. When a job is being viewed, it cannot be modified or saved. The job is not locked automatically, so it remains editable for other users, unless you lock it by clicking the **Lock** button (see further). **Note:** You may have to turn off pop-up blockers.
Save	Allows you to save the job locally. In case of a job folder, the job folder content is compressed and you can download the zip file.
Replace	Allows you to replace the current job file with another one. The uploaded file(s) will be further moved along the Switch flow. **Note:** If another user is trying to replace the job at the same time, a warning is displayed. You can then either cancel your replacement request or overrule the other user's replacement process and start your own. This can be useful if the other user has left the computer in the middle of a replacement request and cannot be reached, or in case of a system crash.
Report	Allows you to view a report with metadata, if there is one associated with the job. For more information, refer to the documentation on Checkpoints.
Lock / Unlock	Lock: Allows you to lock the job, so that the job (and the report) cannot be processed, edited, reverted or replaced by any other user. Other users can still view the job, save a local copy and open the individual job card, but they will get a message stating that the job is in use by another user. Unlock: Allows you to unlock jobs you have locked yourself.

Option	Meaning
	Note: Users that belong to the administrator group can unlock all jobs; group managers can unlock all jobs from users in their group.
Edit in (application)	Allows you to edit the job file in the native application. While a job is being edited, following buttons are displayed: • : to upload the changed job file • : to cancel editing For the full procedure, refer to *Editing a job in a Checkpoint (Switch Helper)* on page 355. **Note:** This option is only available if you have installed the Switch Helper (a small tool that you can download from the *the Enfocus website*). If you haven't, you can also edit the job file, but you'll first have to download and save it locally. Refer to *Editing a job in a Checkpoint (no Switch Helper)* on page 355.

Editing a job in a Checkpoint (Switch Helper)

If you have installed the Switch Helper (a small tool that you can download from the *the Enfocus website*), you'll have an **Edit <in application>** button.

To edit a job

1. Click the **Edit** button .
   The file is opened in the native application, for example Adobe Acrobat. The **Edit** button on the Portal is replaced with an **Update** and a **Cancel** button .
2. Make the required changes.
3. Save the file in the native application.
4. Click the **Update** button to upload the changed version.

Editing a job in a Checkpoint (no Switch Helper)

This procedure is applicable if you're using Switch 2017 or if you haven't installed the Switch Helper application.

To edit a job

1. Lock the job file(s), so no one else can make changes while you're busy with the file.
2. Save the job locally.
3. Make the required changes to your local copy.
4. Use the **Replace** button to upload the changed version.

5.5. Working with the additional Switch modules

This section discusses the Switch modules that can be added to the Switch Core Engine. It starts with the feature matrix, which gives an overview of what you can do with each module.

Note that, in order to be able to use a particular module, you must have a valid license. For more information on activating modules, refer to *Installing, activating and starting Switch* on page 12.

5.5.1. Feature matrix

The following table indicates what you can do in Switch, depending on the activated modules:

Feature	Switch Core Engine	Config module	Metadata module	Scripting module	Switch Client module	Reporting module
Switch Server and Designer	✔					
Flow design (canvas, flows pane, elements pane, properties pane, ...)	✔					
Flow execution (feedback on canvas, messages overview, dashboard pane, statistics pane)	✔					
Built-in tools (see *Flow elements matrix* on page 208), apps	✔					
Configurators for third-party applications		✔				
Hierarchy info and email info (internal metadata)	✔					

Feature	Switch Core Engine	Config module	Metadata module	Scripting module	Switch Client module	Reporting module
Variables and read-only embedded metadata (EXIF, IPTC, XMP)			✔			
Writing and updating external Xpath-based metadata (XMP)			✔			
External metadata (XML, JDF) and writable embedded metadata			✔			
Script expressions and script elements				✔		
Script development environment (SwitchScripter)				✔		
Scripted plug-ins (if licensed by Enfocus)				✔		
Setup for the legacy SwitchClient/ Switch Web Portal (users pane, Submit point, Checkpoint)					✔	
Access to dashboards on						✔

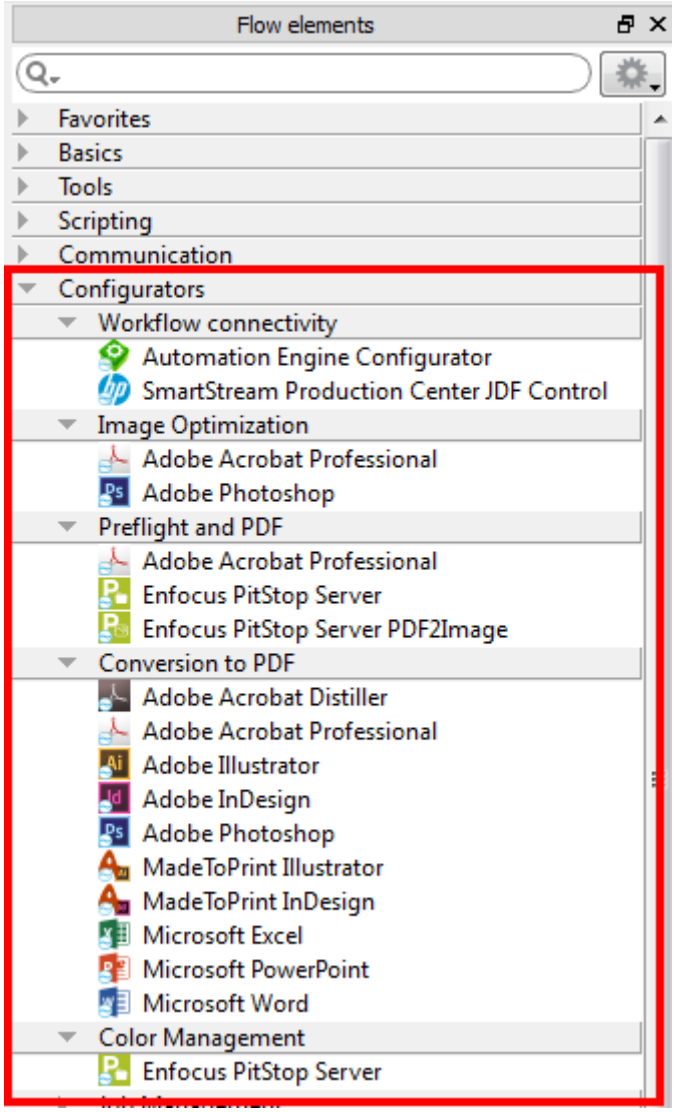
Feature	Switch Core Engine	Config module	Metadata module	Scripting module	Switch Client module	Reporting module
the Switch Web Portal						

5.5.2. Configurator Module

5.5.2.1. About the Configurator Module

If you have licensed the Configurator Module, a number of additional processes can be performed, i.e. by third-party applications (Adobe Creative Suite, Adobe Acrobat Professional, Automation Engine...) integrated in Switch. This is possible thanks to the **configurator flow elements**, which allow you to **connect to these applications from within a Switch flow**.

Configurators are available in the Configurators category of the Flow elements pane, and must be dropped onto the canvas, just like the other flow elements.



Note: You can only use configurators for applications that you have installed - preferably before installing Switch; if installed while Switch is running, make sure to restart the service to allow Switch to find the application. Configurators for applications that are not available are hidden or displayed in gray (depending on your settings - to change these settings, click in the upper right corner of the pane).

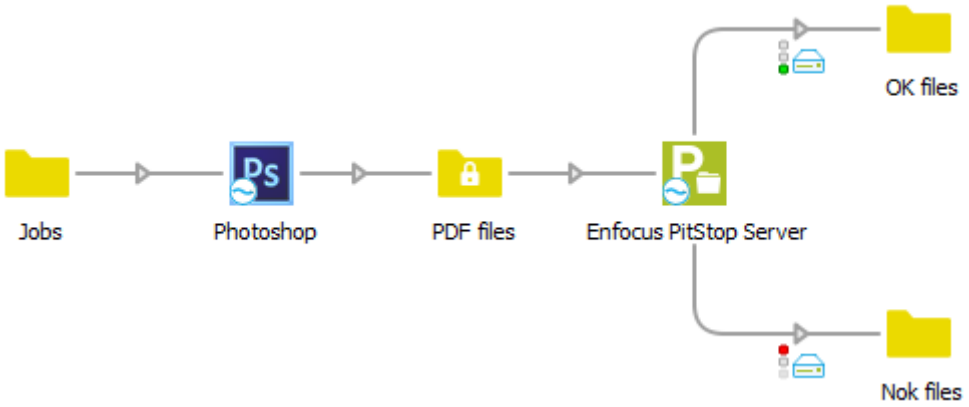
The configurators are grouped into different categories. Configurators that are not signed (i.e. NOT approved by Enfocus) - this is possible if you have created them yourself using SwitchScripter - are placed in a category called "Custom".

How it works

Configurators allow you to send files to 3rd applications from within a Switch workflow. The sent files are processed by this application, and once processed, they are returned to Switch, so that Switch can further process the resulting files as required.

Note: As the files are managed continually in Switch, Switch job data (hierarchy information, metadata) is automatically maintained throughout the flow.

In the example below, the input files are first sent to Photoshop for converting the images to PDF; afterwards the resulting PDFs are sent to PitStop Server to be preflighted. The result of the preflight (OK or not OK) is used to sort the output files.



5.5.2.2. About the configurators

Configurators

After licensing the Configurator Module, you will see a number of configurators in the Flow elements pane. They are included in the Switch installer and automatically updated if a more recent version is available in the next update.

However, there are many more third-party applications that have configurators for Switch. For a complete list, go to *https://www.enfocus.com/en/products/switch/partner-integrations-crossroads*.

To use these configurators with Switch, you must download and install them.

Note that you must also have installed the third-party application. Otherwise the configurator may be shown in the Flow elements pane (in gray), but you won't be able to use it.

Note: When installing an application, make sure to close Switch during the installation, or to restart Switch afterwards. This is necessary for Switch to recognize the newly installed application.

Additional flow elements for which no configurator is available

As it is not feasible to have a configurator for every application on the market, the following two flow elements can be used to automate or interact with third-party applications for which there is no configurator:

- *Execute command* allows you to configure command-line applications through the regular Switch user interface (rather than console commands and options).
- *Generic application* allows you to control any third-party application that supports hot folders.

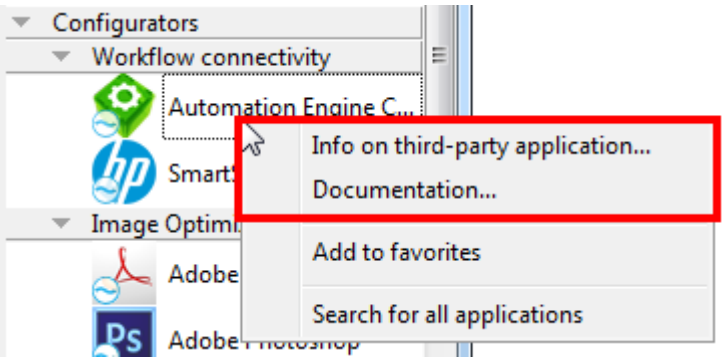
These flow elements are only available if you have licensed the Configurator Module.

PitStop Server and PitStop Server PDF2Image Configurator

If you have an active PitStop Server license, you don't need to activate the Configurator Module to use the PitStop Server and the PitStop Server PDF2Image Configurator. In that case, the PitStop Server Configurators are also available if you have only licensed the Core Engine Module.

More information needed?

- Go to the *Switch Partner Integrations page on the Enfocus website*.
- In Switch, right-click the Configurator and select **Info on third-party application** or **Documentation**.



- Check this Reference Guide. It may contain additional information about the configurator you are interested in (See *Remarks/Extra documentation* in *Configurator overview* on page 361).

Configurator overview

Configurator	Remarks/Extra documentation
AccuZIP	
Adobe Acrobat Distiller	Scripted plug-in as of Switch 13*
Adobe Acrobat Professional	Scripted plug-in as of Switch 13*
Adobe Illustrator	Scripted plug-in as of Switch 13*, updated in Switch 2017
Adobe InDesign	Scripted plug-in as of Switch 13*, updated in Switch 2017
Adobe InDesign Server	Scripted plug-in as of Switch 13*
Adobe Photoshop	Scripted plug-in as of Switch 13*, updated in Switch 2017
Alwan ColorHub	
Apago PDF Enhancer	
Apago PDFspy	
Apple Automator	Scripted plug-in as of **Switch 2017 update 1***
Aproove	

Configurator	Remarks/Extra documentation
Automation Engine	Extra documentation (system requirements and troubleshooting) for the Automation Engine Configurator is available at: *http://www.enfocus.com/manuals/Extra/Switch/SwitchAutomationEngineConfigurator.pdf*
Axaio MadeToPrint InDesign	
Axaio MadeToPrint InDesign Server	
Axaio MadeToPrint Illustrator	
Axaio MadeToPrint QuarkXPress	
Caldera Nexio Collect	Available since Switch 13
Caldera Nexio Submit	Available since Switch 13
callas PDFaPilot	
callas pdfToolbox Server	
callas pdfaPilot	
callas Toolbox Actions	
callas Toolbox Compare	
callas Toolbox ConvertColors	
callas Toolbox Impose	
callas Toolbox Profiles	
CHILI Publisher	
ColorLogic ProfileTagger	
ColorLogic ZePrA	
Convert to Twixl Web Reader	
CorelDRAW	As of Switch 13, compatible with CorelDRAW X7 **Note:** The **Fail jobs with unavailable images** option must be set to **Yes**, if you're using CorelDRAW X7; this option can only be turned off if you're using an older version of CorelDRAW.
DesignMerge Pro	**New in Switch 2017 update 1**
Dynagram InpO2	
EFI Fiery XF	
Elpical Claro	
Elpical Claro Premedia Server	
Enfocus PitStop Server	

Configurator	Remarks/Extra documentation
Enfocus PitStop Server PDF2Image	Available since Switch 13 **Note:** This configurator is installed and updated with PitStop Server. If you're using PitStop Server 13 update 1 or later, the configurator is able to handle Switch metadata attached to the PDFs you're converting!
Firstlogic DQ-U.S.	**New in Switch 2017**
GlobalVision Inc Barproof	Windows only
GMG ColorServer	**New in Switch 2017 update 1**
Harlequine RIP	**New in Switch 2017 update 1**
HP SmartStream Designer Ganging	
HP SmartStream Designer Impositon	
HP SmartStream Designer VDP	
HP SmartStream Production Center JDF Control	
HP Digital Front End JDF Controler	
Imaging Solutions VIESUS	
Made ToPrint Illustrator	
Made ToPrint InDesign	
Made ToPrint InDesign Server	
Made ToPrint QuarkXPress	
Microsoft Excel	
Microsoft PowerPoint	
Microsoft Word	Separate versions for Mac OS and Windows
Phoenix Plan	
QuarkXPress (Mac only)	Support for QuarkXPress 2015 (Switch 13)
Quite Hot Imposing	
Saxonica Saxon	Available since Switch 13
StuffIt Deluxe	
Ultimate Impostrip On Demand	
Upload to Twixl Distribution Platform	
WoodWing Enterprise Download	
WoodWing Enterprise Upload	

* As of Switch 2017, the old versions of the **Adobe configurators** (C++ applications) are no longer supported. The new scripted plug-ins are compatible with Adobe CC 2015 (and later) and Adobe Acrobat DC.

Downloading and installing a configurator from within Switch

A number of configurators are installed by default, together with Switch, but you can afterwards install additional configurators as required.

Note:

- It is only useful to install configurators for third-party applications that you have installed. Otherwise you will not be able to use these configurators.
- You must have licensed the Configurator module.

To install a configurator from within Switch

1. In Switch, go to **Help** > **Download configurators** (only available if you have licensed the Configurator module).
   The Enfocus Pack Manager is displayed.
2. In the Sources column, click **Web**.
   The colors of the icons refer to the installed version of the configurator:
   - Green indicates that the latest version of the configurator is installed, so no need to update it.
   - Orange indicates that a newever version of the configurator is available.
   - Grey indicates that the configurator has not been installed yet.
3. Select the appropriate configurator.
   Move your cursor over the configurator, to see a tooltip with (version) information.

   Tip: If you don't find the configurator you need, click the **Actions** button (in the top right corner of the dialog) and select **Browse all configurators**. This brings you to the the Enfocus website (the Switch Partner integrations overview).
4. Click **Download** (button in the bottom right corner) and save the configurator (with file extension .enfpack) to your local system.
5. To install the configurator, do one of the following:
   - Double-click the downloaded enfpack.
   - Drag the downloaded enfpack onto the Flow elements pane in Switch.
   - In the Flow elements pane, click , select **Open and install** and choose the downloaded enfpack.
6. Click **OK** to confirm.
   The configurator is added to the Flow elements pane (in the Configurator category). In Pack Manager, the icon next to the configurator has become green ( ).

If for any reason you would like to uninstall a configurator, you can do so via the context menu of the configurator in the Flow elements pane.

Downloading and installing a configurator from the Partner integrations overview on the Enfocus website

A number of configurators are installed by default, together with Switch, but you can afterwards install additional configurators as required.

Note:

- It is only useful to install configurators for third-party applications that you have installed. Otherwise you will not be able to use these configurators.
- You must have licensed the Configurator module.

To install a configurator from the Enfocus website

1. Go to the *the Enfocus website (Switch Partner integrations overview)*
2. Search for the Integration partner of your choice.
3. Search for the appropriate configurator.
4. Download it to your local computer.
   A configurator is a file with file extension .enfpack.
5. To install the configurator, do one of the following:
   - Double-click the downloaded configurator.
   - Drag the downloaded enfpack onto the Flow elements pane in Switch.
   - In the Flow elements pane, click , select **Open and install** and choose the downloaded enfpack.
6. Click **OK** to confirm.
   The configurator is added to the Flow elements pane (in the Configurator category). In Pack Manager, the icon next to the configurator has become green ( ).

If for any reason you would like to uninstall a configurator, you can do so via the context menu of the configurator in the Flow elements pane.

Installing a different version of a configurator

There may be several reasons why you need a different version of a configurator. The most obvious one is that you want to upgrade to the most recent version, but you can also have to switch to another version because of compatibility with the third-party application or with the version of Switch.

To install a different version of configurator that is already installed in your Switch

1. In Switch, go to **Help** > **Download configurators** (only available if you have licensed the Configurator module).
   The Enfocus Pack Manager is displayed.
2. Do one of the following:

- To download the *latest* version of an already installed configurator:
  1. In the Sources column, click **Installed**.
  2. Select the configurator you want to update.
  3. Click **Download latest version** and save the configurator (with file extension .enfpack) to your local system.
- To download a *particular* version of a configurator:
  1. In the Sources column, click **Web**.
  2. If you consider installing an older version of the configurator (for example for compatibility reasons), click the **Actions** button (in the top right corner) and select **Show** > **Show old versions**.
  3. Select the configurator and the version of your choice.
  4. Click **Download** and save the configurator (with file extension .enfpack) to your local system.

3. To install the downloaded version, do one of the following:
   - Double-click the downloaded enfpack.
   - Drag the downloaded enfpack onto the Flow elements pane in Switch.
   - In the Flow elements pane, click , select **Open and install** and choose the downloaded enfpack.
4. Click **OK** to confirm.

5.5.2.3. Smart Preflight

The following topics are only relevant if you're using the Enfocus PitStop Server configurators, as only these configurators support Smart Preflight. It's explained further in this document what Smart Preflight is and how it can be used in the Enfocus products in general and in Switch in particular.

About Smart Preflight

Smart Preflight is a functionality that allows you to handle many different job types and specifications by using only one Preflight Profile. This is possible, thanks to the use of *variables*.

For example, if one of your preflight settings checks the page size, it is sufficient to define one Profile using a variable with the most commonly used page size (e.g. A4) as the default. If a document type with a different page size comes in (e.g. a leaflet or a newspaper), you can select the required page size from a pre-defined list or type the appropriate value (depending on how the variable is defined) in the dialog that pops up when running the preflight check.

There are two types of variables:

- **Constant variables** are variables that get their value from user input (in PitStop Pro, as in the example above) or from a Job Ticket or a database (in PitStop Server and Connect):
  - In **PitStop Pro**, a dialog pops up just before running the preflight check. You can manually enter the required values.

- In **PitStop Server**, you must send an XML/JDF Job Ticket along with the PDF. The information in this Job Ticket (e.g. the page size) is used to determine the value of the variables.
- In the **PitStop Server Configurator** (for use with Switch), the information can be taken either from a Job Ticket or from a database.
- In **Connect**, you can create Job Tickets that collect job information for each document processed by a Connector. The metadata in these Job Tickets will be used to determine the value of the variables.

- **Rule-based variables** are variables of which the value is calculated based on other variables (possible in all Enfocus products)

  For example, suppose you want to check the ink coverage using a Preflight Profile. The optimal ink coverage depends on several different factors, just like the paper type and the printing method. Without variables, you must define different Profiles for each combination of paper and printing method, each with fixed total ink coverage values (e.g. Profile 1 for Uncoated + Sheetfed Litho and Profile 2 for coated + Sheetfed Litho, ...). However, using variables, you can define one Profile and enter the required information for the job (paper type and printing method) to calculate the optimal ink coverage at run-time.

These two types of variables can be combined (i.e. rule-based variables calculated based on a drop-down of constant variables), making it possible to configure multiple checks and fixes based on a single user input (PitStop Pro) or on only one value in a Job Ticket or database.

	Constants **User input**	**Constants** **Job Tickets**	**Constants** **Databases**	**Rule-based**
PitStop Pro	✓			✓
PitStop Server		✓		✓
PitStop Server with Enfocus Switch		✓	✓	✓
Enfocus Connect/Connectors		✓	✓	✓

Note: Variables can be used in Action Lists as well, in a similar way as in Preflight.

Getting started with Smart Preflight

Variables and Variable Sets

Before you can start working with Smart Preflight, you need to define the variables you want to use and save them within a Variable Set (a file format which can be exported and imported).

When defining your Preflight Profile, you can then select the variables you need from this Variable Set. Note that you can create different Variable Sets (e.g. if you would like to define different Variable Sets for different document types or different Enfocus products) and that a Variable Set can contain as many variables as required. However, you can apply only one Variable Set at a time (e.g. one per hot folder in PitStop Server, one active Variable Set in PitStop Pro) and it should match the Variable Set used in the Preflight Profile concerned.

Note: PitStop Pro and PitStop Server can share the same Smart Preflight Variable Sets, much like they can share Preflight Profiles or Action Lists. However, some variable types (see further) are useful in PitStop Pro only and others work only in PitStop Server. Unsupported variables will use a default value or will generate a failure.

How to decide which preflight settings could be configured as variables?

Good candidates are preflight settings that can change from job to job, for example:

- Trim page size
- Total ink coverage
- Number of colors defined

Preflight settings that are often the same can better be configured as fixed values. Some examples:

- Embedded fonts
- Security settings
- Document contains pre-separated pages

Getting started

The following topics explain step by step how to configure a Variable Set and how to use the variables in your Preflight Profiles.

Setting up Smart Preflight

Smart Preflight setup: overview

This topic describes the steps required to set up and use Smart Preflight.

1. *Configure a Variable Set:*
   a. *Create a Variable Set.*
   b. *Define the Variables to be used.*
2. *Apply the variables to the appropriate checks in your Preflight Profile.*
3. *Run the Preflight Profile with the variables enabled.*

Configuring a Variable Set

Creating or editing a Variable Set

You need a Variable Set (which contains the variables you need) in order to use variables in a Preflight Profile or Action List. You can create a new one or re-use an existing one (i.e. add any new variables as required).

Important: Although you can create more than one Variable Set, we recommend that you keep all your variables in one Set. Only if you are working with both PitStop Pro and PitStop Server, you might consider using different sets. However, if you use variables of different Variable Sets within a single Preflight Profile, only the "active" (applied)

Variable Set variables will contain values. Variables used from inactive Variable Sets will be blank!

To create or edit a Variable Set

1. In the Properties pane of the PitStop Server Configurator
   a. Locate the Variable Set property.
   b. Click .
   c. Click **Select Variable Set**.

   The Select variable set: Variable Set Panel appears, displaying all the installed Variable Sets as well as any local Variable Sets that have been defined.

2. Do one of the following:
   - To edit an existing Variable Set, double-click the Set concerned.
   - To create a new Variable Set, from the actions menu ( ), select **New** > **New**.

   The Enfocus Variable Set Editor appears.

3. Enter the appropriate details (a meaningful name and a description) and lock the Variable Set if required.

   See *Locking a Variable Set (optional)* on page 369

4. Define the Variables you need.

   See *Defining Smart Preflight variables* on page 370

5. Click **Save**.
   The new Variable Set is saved to your Local Switch folder.

   Note: This Local folder is shared with any other Enfocus applications that you may have installed.

Locking a Variable Set (optional)

You can lock a Variable Set with a password, to prevent other users from editing the Variable Set and viewing details when they open it in the Enfocus Variable Set Editor.

To lock a Variable Set

1. Open the Variable Set.

   See *Creating or editing a Variable Set* on page 368

2. In the Enfocus Variable Set Editor, click **SETUP** > **General**.

3. From the Permissions list, select **Locked**.

4. Enter a password and repeat it.

   Note that you can change the password at any point of time if required, by clicking the **Change Password** button.

5. Click **OK**.

6. Click **Save**.

The Variable Set is locked. Users wanting to edit or view the details of the Variable Set must click the Lock icon and enter the correct password.

Defining Smart Preflight variables

The Smart Preflight variables for use in Preflight Profiles must be defined before you can use them. This topic explains how you can create and define new variables.

To define Smart Preflight variables

1. Open the dialog with the Variable Set that will contain the new variable.
   See step 1 of *Creating or editing a Variable Set* on page 368.
2. In the left part of the Enfocus Variable Set Editor, under Variables, click ⊞.
3. Enter the required details for the new variable:

Field	Meaning
Name	Choose a meaningful name, for example, the check the variable is intended for. This name will be visible in the Preflight Profile editor or in the Action List editor, when applying a variable to a check or fix (see *Applying variables to a check in a Preflight Profile* on page 378). For this reason, it is advisable to keep this name as short as possible.
User Readable Name	Use this field if the variable name is too technical or too short to be clear enough.
Type (*First list*)	Choose the appropriate type. Refer to *Smart Preflight Variables: types* on page 371.
Type (*Second list*)	The type of the values produced by this variable. For example, if a variable for a trim page size is to be created, then it must have a "Length" variable type. If a variable is needed to select or deselect a check box (such as to turn on a correction), then a Boolean variable type needs to be defined. Some examples for each option: • Number - Page count, Number of separations, etc • Length (i.e. a number of measurement fields) - Page trim size, bleed amount, etc • String - Entry for a metadata field • Boolean - Selection for any checkboxes **Note:** Make sure that this value type matches the preflight check setting it is intended for. When applying variables to a preflight check setting, *only the variables that match that type of entry will be displayed*.

Field	Meaning
Type (*Third list*)	In case of a Job Ticket in combination with value type "Length", a third list is available, allowing you to choose the appropriate unit, for example "Points", "Inches", ... **Note:** The unit displayed in the Default Value field (lower) depends on the application Preferences.
Description	Optionally, provide a brief description.

4. Proceed with the fields in the lower part of the dialog.

   This part of the procedure depends on the chosen variable type:

   - *Constant variable definition* on page 372.
   - *Rule based variable definition* on page 373.
   - *Variable definition: Text with variables* on page 376.
   - *Variable definition: Script expression* on page 377.

   Note: For example variables, have a look at the Smart Preflight Variable Set - PitStop Pro - v1.1. (available under **Standard** > **Smart Preflight**).

5. Click **Save**.

Smart Preflight Variables: types

When defining a variable, you must choose a type. The table below gives an overview of the available variable types per application and explains their meaning.

Type	Meaning	Application
Constant	In PitStop Pro, when a Constant variable is applied to a preflight check, a default value will be displayed to the operator, allowing him to override it before running that preflight check. Constants can be a text string, a number, a length (i.e. a measurement) or a boolean (yes/no or on/off) value. Constant variables are available in PitStop Server to stay compatible with PitStop Pro. Only their default value is used when processing. No choice to override their value is given at the time of processing, since PitStop Server is intended to process files completely "hands-off".	PitStop Pro/Server PitStop Server Configurator in Switch Enfocus Connect
Rule Based	A Rule Based variable allows you to take values from other variables and use them to create a new value, based on different conditions. For example, variables representing paper type and printing method could both be used to define the value for the necessary Total Ink Coverage.	PitStop Pro/Server PitStop Server Configurator in Switch Enfocus Connect

Type	Meaning	Application
Job Ticket	Job Ticket variable values are extracted from an XML/JDF file submitted to PitStop Server or a Connector in conjunction with the PDF job file. These variables can either change a single setting or be linked to Rule Based variables for more complex processing. **Note:** The Job Ticket variables of the PitStop Server cannot be used in Switch. However, you can change the Job Ticket variables to either Text with Variables or Script Expression and modify them to correspond to the behavior of Switch.	PitStop Server Enfocus Connect
Text with variables	Variable values are defined using the Switch variables.	PitStop Server Configurator in Switch
Script expressions	Variable values are defined using JavaScript.	PitStop Server Configurator in Switch

Constant variable definition

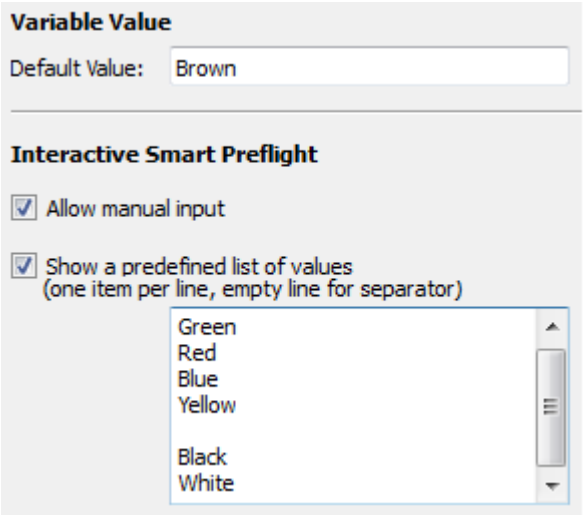
Options

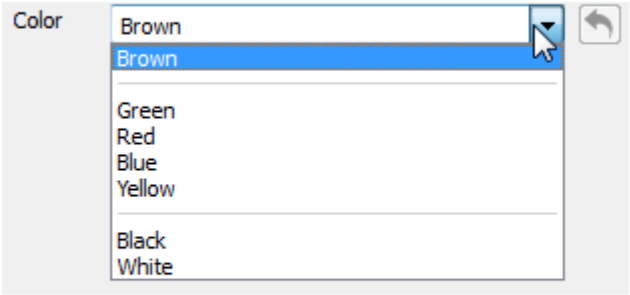
The following table gives an overview of the constant-specific options.

Option	Description
Default Value	Fixed value, which will be used when Switch runs a Preflight Profile that needs this variable. **Note:** Constant variables used in PitStop Server cannot be manipulated by the user. Hence, PitStop Server will only use the default value.
Allow manual input	Enables users to type values when they run the Preflight Profile.
Show a predefined list of values	Enables users to select a predefined value from a list of values. If the value type is Number or Length, you will have the possibility to mask the value and provide an alternate name for the user. **Tip:** You can change the order of the items in the list by just selecting a value and dragging it up or down and dropping it in the desired position.

Example

Below you can see an example of a constant variable definition (left) and the resulting list the users will see when running the Preflight Profile (right).





.

Combining options

Allow manual input and **Show a predefined list** can be combined. The following table explains what this means.

Selected options	Meaning
Both enabled	Users can either select a value from the predefined list but or manually enter a value.
Both disabled	Users will see the default value in a read-only text box. They cannot change it.
Only **Allow manual input** enabled	Users can manually enter a value. There is no list to choose from.
Only **Show a predefined list** enabled	Users can select a value from the predefined list. They cannot enter a value themselves.

Rule based variable definition

About rule based variables

The concept of a rule based variable is to build a variable that will change based on the state of another setting. For example:

Rule based variable "Image Resolution" is defined as follows:

```
IF "Job type" is "Offset" THEN set "Image Resolution" to 300 ppi
ELSE
IF "Job type" is "Digital", THEN set "Image Resolution" to 150 ppi
```

Rule based variables get their values based on one or more rules. Each rule has two parts: a condition to trigger the rule (IF) and the value to be used when that condition is triggered (THEN).

The condition contains one or more comparisons of a variable with a value. In the above example, the variable "Job type" is compared with the value "Digital". These comparisons can be combined with "AND" and "OR" to create complex conditions.

If a rule is not triggered, the next rule is tried. There must be an ELSE rule at the very end, that is triggered if none of the conditions are met.

Because a rule based variable always needs to be compared with one or more other variables, you will always need to create **at least one other variable** to make a rule based variable work. In the above example, you need to know the value of the "Job type" variable in order to determine the value of "Image Resolution". In PitStop Server, the variable to compare with will usually be a Job Ticket variable. In PitStop Pro, this will usually be a constant variable which offers the user a list of predefined constant values to choose from.

How to proceed

Proceed as follows:

Note: Before starting the configuration in the software, we recommend writing down the rule for yourself (using IF/ELSE statements). This will make clear which variables you need.

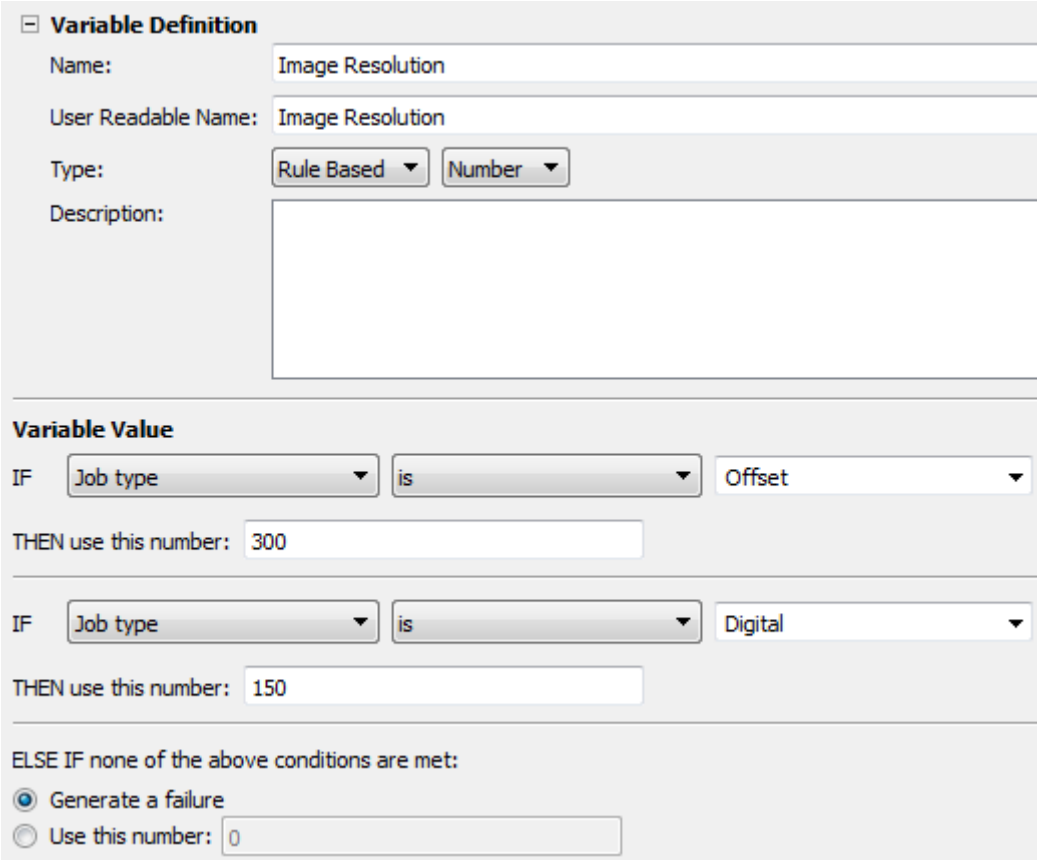
1. Define the variable(s) you need.
2. Define the rule based variable itself:
   - Choose **Rule Based** as Type and determine the value type, for example "Number".
   - Build the rules:
     - The first list (preceded by "IF") allows you to select any earlier defined variable.
     - Choose "is", "is not", "begins with", ... as required and enter or select the appropriate value. Options depend on the variable chosen in the previous step.
     - Click the appropriate operator (AND/OR). (The chosen operator is added to the rule.)

       AND/OR statements will add a condition to the selected rule, making the rule dependent on two or more conditions.
     - Enter/Select the resulting value (the type depends on the chosen value type).
     - If required, click **ELSE** to add an alternative rule to the overall variable (=IF) and proceed in the same way.
     - Determine what should happen in case none of the conditions are met. You can either generate a failure (so the preflight check will generate a preflight error) or enter a default value.
3. Save the Variable Set.

Example 1

Below you can see the definition of the "Image Resolution" rule based variable (value type = Number). It makes use of an earlier defined variable: "Job type", which is a constant (text) variable with "Offset" and "Digital" as possible values.

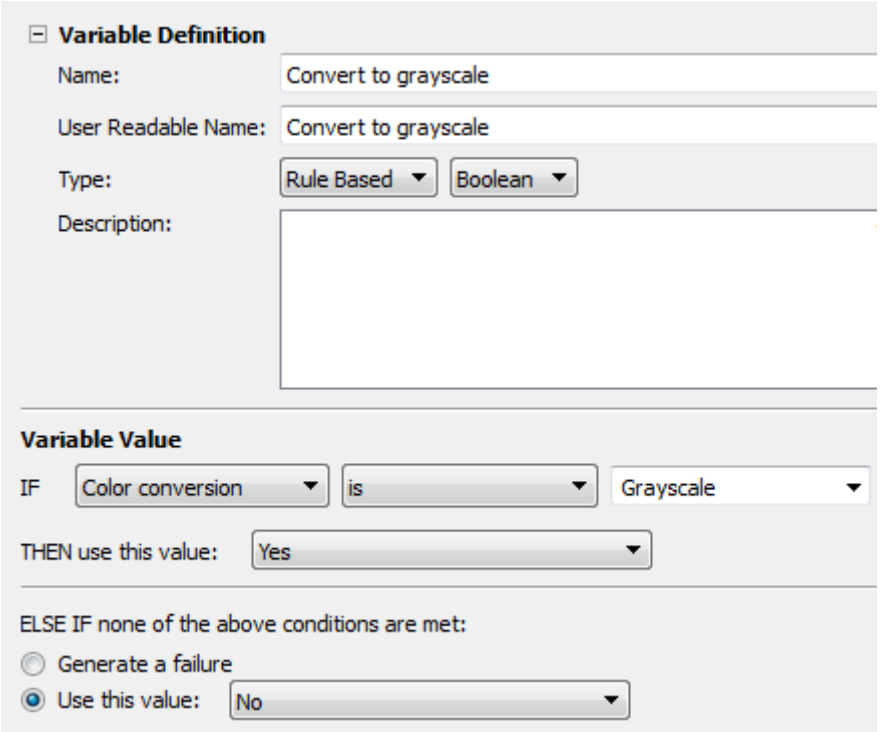
Depending on the value of "Job type", the Image Resolution will be different (300 or 150). If the Job type is different from the ones for which a rule has been configured, a preflight error will be generated.



Example 2

Below you can see the definition of the "Convert to grayscale" rule based variable (value type = Boolean). It makes use of an earlier defined variable: "Color conversion", which is a constant (text) variable with "Grayscale" as one of the possible values.

If the value of the "Color conversion" variable is "Grayscale", the value of "Convert to grayscale" will be "Yes". If this is not the case (e.g. Color conversion is "CMYK"), the value of "Convert to grayscale" will be "No" (=default value).



Variable definition: Text with variables

About Text with variables

This type of variable provides access to run-time information about the Switch flow environment and about the job, including embedded metadata fields and external metadata fields, without the need for scripting.

Note that you need an active license for the Switch Databases Module, if you want to use database information, and active license for the Switch Metadata Module, to use metadata fields.

Length/Unit

When you select "Length" as the value type for this variable, an additional dropdown menu called **Unit** appears, allowing you to choose the appropriate measuring unit.

Note: Make sure to use the same unit in the Variable Value text box below. Otherwise, the chosen value from the **Unit** list will be ignored. For example, if you choose "Centimeters" in the **Unit** dropdown and enter "20 mm" in the **Variable Value** text box, then Smart Preflight will consider millimeter as the unit and centimeter will be ignored.

How to proceed

To define a variable using the text with variables option, proceed as follows:

1. To determine the Variable Value, click the ... button.
2. In the Define text with variables dialog, select the appropriate Variable Group (first column), Variable (2nd column) and attributes (3rd column).
3. Click **Insert variable**.

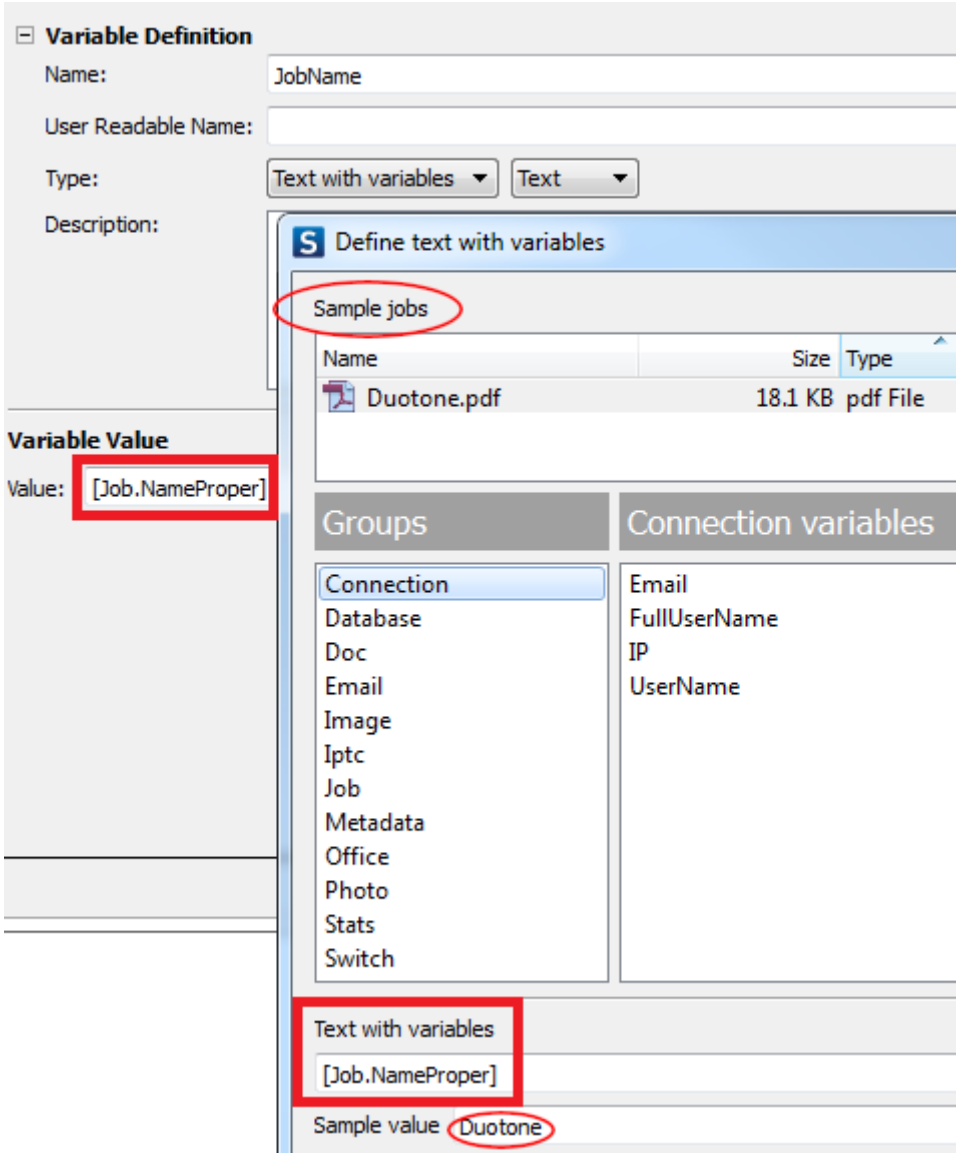
Tip: Use a sample job to see the actual value of the inserted variable.

For more details, refer to *Defining text with variables* on page 384

Example 1

Below you can see the definition of the "JobName" variable (Text). The value returned from the sample Job is "Duotone".

This is a basic example. For more complex cases, refer to the chapter *Metadata* on page 383



Variable definition: Script expression

About script expressions

A script expression is a JavaScript program that gets evaluated in the context of a job (file or jobfolder) to determine the value of a particular property of a flow element or connection. This allows the property value to depend on the job or its associated metadata.

Note that you need an active license for the Scripting Module in order to configure and use this type of variable.

Length/Unit

When you select "Length" as the value type for this variable, an additional dropdown menu called **Unit** appears, allowing you to choose the appropriate measuring unit.

Note: Make sure to use the same unit in the Variable Value text box below. Otherwise, the chosen value from the **Unit** list will be ignored. For example, if you choose "Centimeters" in the **Unit** dropdown and enter "20 mm" in the **Variable Value** text box, then Smart Preflight will consider millimeter as the unit and centimeter will be ignored.

How to proceed

To define a variable using a script expression, do one of the following:

- Type the JavaScript source code in the Variable Value box and click **Save** to save the code to a file.
- Click **Open** and select an existing script (*.js). The content of the selected script will be shown in the Variable Value box. If you make any changes, makes sure to save them to a file (**Save**/**Save as**).

Applying a Variable Set

Once you have defined your Variable Set, you must "apply" or activate the Variable Set you want to use. This is extremely important if you have defined more than one Variable Set; if the variables used in your Preflight Profile are taken from a different Set than the one that is activated, the variable values in the Profile will remain blank.

To apply a Variable Set

1. In the properties of the Switch Server Configurator, click >.
2. Select the Variable Set that contains the variables used in a Preflight Profile.

Applying variables to a check in a Preflight Profile

Variables allow you to process different jobs and job types with one Preflight Profile; instead of using multiple Profiles with different, fixed values, you enter a variable which is defined when running the Preflight Profile.

Note that you need to have defined a Variable Set with Smart Preflight variables before you can use variables in a Preflight Profile.

To use variables in a Preflight Profile

1. Click **PitStop Pro** > **Preflight Profiles** and double-click the Preflight Profile concerned.
2. In your Preflight Profile, open the CHECK ON: category for which you want to use a variable.
3. Do one of the following:

- If a variable should be used for enabling or disabling **all checks on the tab**, click the **Actions** link in the top right corner of the tab and select **Enable Variable Names**. A button appears next to the checkbox of Enable checks without restriction/Enable checks of <restriction>.
- If a variable should be used for one particular check, in the attributes of the check concerned, click the **Enable Variable Names button**. A button appears next to each property where it is relevant.

4. Click next to the property for which you want to use a variable.

   Note that this button is only shown when the check can have a variable applied.

5. In the Select a Variable dialog, make sure **Use a Variable from the selected Variable Set** is selected and select a Variable Set as required.

6. Double-click the variable you want to use for the property concerned.

   Only the variables that match the type required for the property concerned are shown. For example, if you want to define the page width, you need a variable of the type Length.

   The name of the variable is shown in the Preflight Profile.

Running a Smart Preflight check

If you want to preflight PDF files in Switch using the **PitStop Server Configurator**, you must build a flow with the PitStop Server Configurator and set all properties correctly. As PitStop Server is an automated system, there is no manual intervention, so the values cannot be entered by the user. Instead, the values are taken from a Job Ticket - at least if the variable type is "Job Ticket". If this is not the case (i.e. if the variable type is "rule based" or "constant"), the default values are used. See also *Smart Preflight Variables: types* on page 371.

Note that all PDF files moved to the PitStop Server Configurator will be preflighted. No additional setup is required.

To learn more about the PitStop Server Configurator, search for the configurator in the Flow Elements pane and select **Documentation** from the context menu.

Using Smart Preflight variables in Action Lists

Smart Preflight variables can also be used in Action Lists.

Using variables instead of fixed values in Action Lists

You can also use Smart Preflight variables to define attributes of your Actions contained in your Action Lists. The advantages are the same as for Preflight Profiles, i.e. you don't need different Action Lists but you can dynamically modify the values just before running the Action or by taking them from a Job Ticket or database.

This topic explains how you can configure an Action to use variables instead of fixed values.

To define your Actions using variables instead of fixed values

1. Click **PitStop Pro** > **Action Lists** and double-click the Action List concerned.

2. Select the Actions you want to define using a Smart Preflight variable.

3. Click the **Actions** link (in the top right corner of the attributes for the Action concerned).
4. Select **Enable Variable Names**.

   This option is only available if it is relevant for the Action concerned.

   The icon appears where it is possible to use a variable.
5. Click .
6. Select the variable you want to use.

   You will only see the variables that can be used in the field concerned. Note that you can choose a different Variable Set if necessary.
7. Click **OK**.

Running an Action List with Smart Preflight variables enabled

If you want to run an Action List with variables enabled on your PDFs using the **PitStop Server Configurator** or the **PitStop Server PDF2Image Configurator**, you must build a flow with this Configurator and set all properties correctly. As PitStop Server is an automated system, there is no manual intervention, so the values cannot be entered by the user. Instead, the values are taken from a Job Ticket - at least if the variable type is "Job Ticket". If this is not the case (i.e. if the variable type is "rule based" or "constant"), the default values are used. See also *Smart Preflight Variables: types* on page 371.

Note that all PDF files moved to the PitStop Server (PDF2Image) Configurator will be processed with the selected Action List. No additional setup is required.

To learn more about the PitStop Server and PitStop Server PDF2Image Configurator, search for the configurator in the Flow elements pane and select **Documentation** from the context menu.

Troubleshooting for Smart Preflight

Following topics explain how to fix some issues you may run across while working with Smart Preflight.

Variable not available to apply a preflight check

Issue

Although the variable is present in the Variable Set, you are not able to select it for a particular preflight check.

Cause/Context

When configuring a preflight check, you must first select the Variable Set concerned. Only variables that belong to this set can be applied.

Variables are (among others) defined using a particular type (Constant, Rule Based, Job Ticket) and value/measurement type (Number, Length, String, Boolean). This value type must match the preflight check settings it is intended for, otherwise it is not displayed when you try to select it.

Fix

Make sure the correct Variable Set is selected. If the variable you want to use is present in a different Variable Set, you may decide to switch Variable Sets or add the variable to the currently selected Variable Set.

Next, review the variable and ensure it's defined as the right "value type" (Number, Length, String or Boolean) to match the preflight check.

Variable Set not supported

Issue

While importing a Variable Set, you get one of the following errors:

- This Variable Set has settings not supported by this version of software. These may be changed or removed when editing the Variable Set.
- The selected Variable Set has been created with a more recent application and cannot be used.

Cause/Context

Variable Sets created with earlier versions of the software are always compatible with new versions. You can import them and use any new features of the software as required. No error messages will be shown.

Variable Sets created with newer versions of the software than the one you're using can be used as long as no new settings were used (as they are not supported by the software). If there is a version mismatch, one of the above mentioned error messages appears.

Fix

If you can import the Variable Set, remove or change the variables containing settings that are not supported.

If you cannot import the new Variable Set, you can either upgrade the software (recommended) or re-create the Variable Set using the older version of the software.

Note that, while saving Variable Sets, Enfocus PitStop Pro will automatically choose the lowest possible Variable Set version number to ensure maximum portability.

Red exclamation mark in front of a variable

Issue

When opening your Variable Set in the Variable Set Editor, you notice that one or more variables in the Variable Set have a red exclamation mark in front of them. Possible warnings:

- The variable uses the unkown variable type ... and cannot be edited.
- Variables from ... are not supported because ... Module is not licensed.

Cause/Context

Not all variable types are compatible with all Enfocus products. For example, "Text with Variables" can only be used with Switch. If a variable is "unknown" to an Enfocus product, it cannot be used or edited, but it won't harm either.

In Switch, some variable types are linked to a particular Switch module. For example, the "text with variables" variable using database fields is only supported if you have an active license for the Switch Database module.

The problem can also be linked to a rule-based variable; if the variable is based on another variable that has been removed or is invalid, the rule-based variable becomes invalid as well and gets a red exclamation mark in front of it.

Fix

If you want to use "unknown" variables, you must change the variable type to a type supported by the product you're using.

If you don't want to use it, just leave it in there; it won't do any harm. You can use (or edit) it again when working with other Enfocus products.

If you want to use variables that require a license that you don't have, please contact Enfocus to buy a license.

In case of invalid rule-based variables, review the rule(s) and correct or re-define the dependent variable(s) as required.

5.5.3. Metadata Module

The Metadata Module enhances the use of metadata in Switch flows: in addition to Switch-specific metadata, it gives access to **other types of metadata** originating from other applications or stored in other formats that are common in the graphical industry.

5.5.3.1. Getting started with the Metadata Module

Access to other types of metadata

Metadata is information about the job you are processing, such as its size, creation date, number of pages, paper type, ... In Switch, this information can be used to route jobs, to rename them, to make decisions, etc.

With the Metadata Module, you have - in addition to Switch-specific metadata - access to XMP metadata (embedded in side the job and available in most jobs created with Adobe products) and to metadata in external files (XML or JDF tickets) submitted with the job.

You can:

- Use metadata in Switch just like regular variables to process your jobs dynamically.
- Visualize metadata for jobs submitted through the Switch Web Portal or processed with a Connector.
- Use the Metadata tools (listed below) to export metadata and convert XML information, preflight logs and reports into other XML formats, HTML or human-readable information.

Metadata tools

With the Metadata Module, you get access to the tools in the Metadata category of the Flow Elements pane:

- *XML Pickup*
- *JDF Pickup*
- *XMP Pickup*

- *XMP Inject*
- *Opaque pickup*
- *Export metadata*

Metadata variables

Once you have "picked up" the metadata set you need using one of the Metadata tools, you can select the variable of your choice from the Metadata variables group. This group is only available if you have an active license for the Metadata Module.

5.5.3.2. Metadata

Metadata overview

What is metadata

In the Switch context, metadata is descriptive information about a job (file or job folder) in a structured electronic form. Metadata is often used to store administrative information associated with a job, and to exchange such information between systems. Metadata can be distinguished from the job contents proper, even if it happens to be embedded in the job.

Historically, metadata has been stored in various proprietary or standard formats. TIFF, EXIF and IPTC tags (often found in image files) are classic examples. More recently, the industry has moved to store metadata as XML, building on the strengths of this ubiquitous format. JDF and Adobe XMP, two XML-based formats, are often used in the publishing industry in addition to generic XML.

Metadata categories

Switch recognizes three categories of metadata depending on the storage mechanism used to convey the information, as described in the following table.

Category	Description
Internal	Switch-specific information stored in the internal job ticket for each job; for example hierarchy info and email info
Embedded	Metadata that is embedded inside the job (as part of the file); for example EXIF or IPTC tags, or an embedded Adobe XMP packet; see *Embedded metadata* on page 425.
External	Metadata that travels with the job but is stored as a distinct entity; for example an XML or JDF file, or a standalone Adobe XMP packet (possibly extracted from the job file); see *External metadata* on page 428.

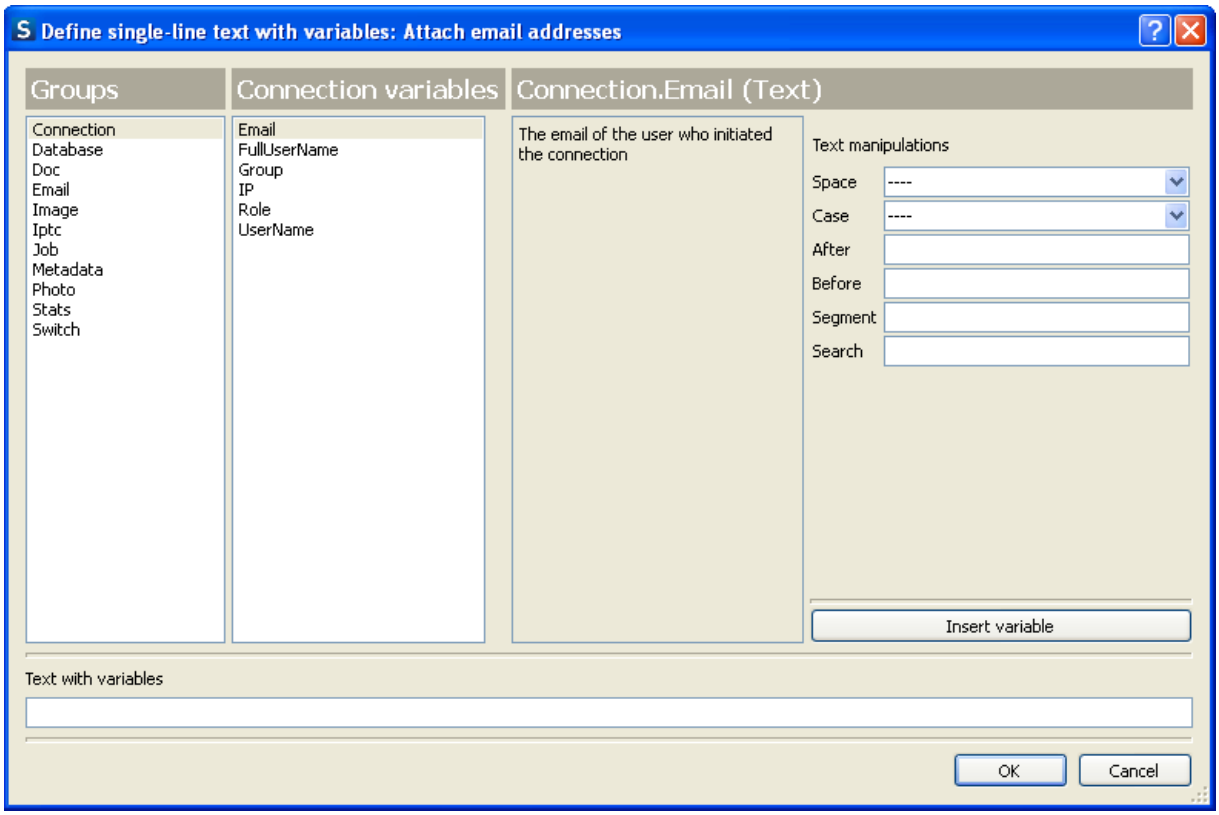
Support for metadata

Switch supports working with metadata in various ways as defined in the following table.

Feature	Benefits
Internal job ticket	Maintaining hierarchy info, email info and other internal metadata used by the Switch tools
Variables	Read-only access to embedded metadata (EXIF, IPTC, XMP) and file information
Pick-up and export	Picking up external metadata (XML, JDF, XMP) from foreign sources and exporting it for external use
Scripting	Read-write access to embedded metadata and external metadata

Defining text with variables

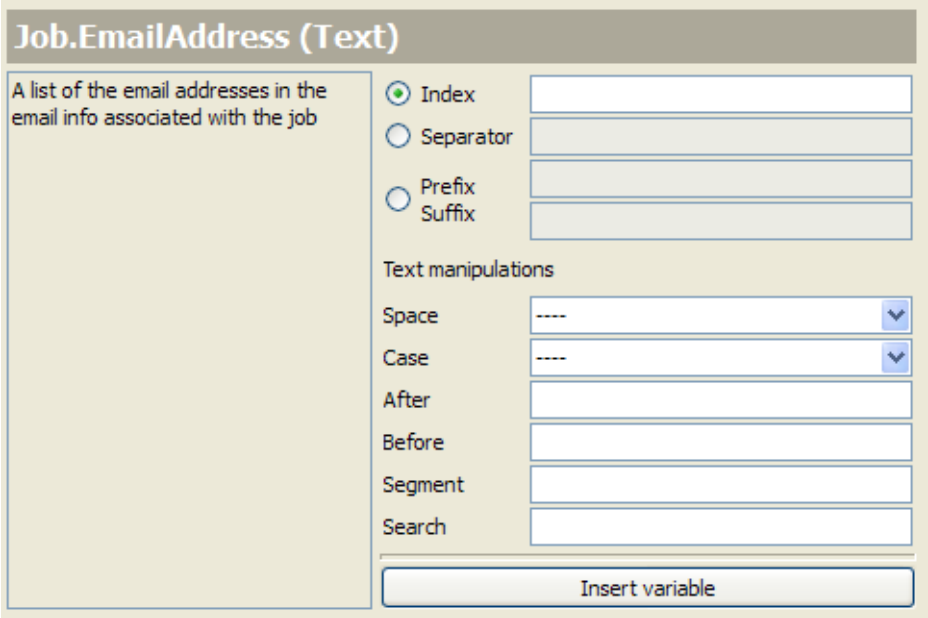
Text properties that support variables can be edited with the **Define single-line text with variables** property editor.



The text field at the bottom contains the text being edited. Variables are simply mixed-in with static text and enclosed in square brackets [ ] (see *Variables* on page 393). The list boxes and text fields in the top portion of the property editor offer guidance for dealing with variables, as explained below.

Arguments

The rightmost column shows any arguments relevant for the selected variable; for example:



See *Data types* on page 397, *Formatting* on page 397, *Indexed variables* on page 400, and *String manipulations* on page 401.

Entering text

You can type constant text in the text field at the bottom at any time. You can also leave the field empty and just insert one or more variables using the procedures explained in the following sections.

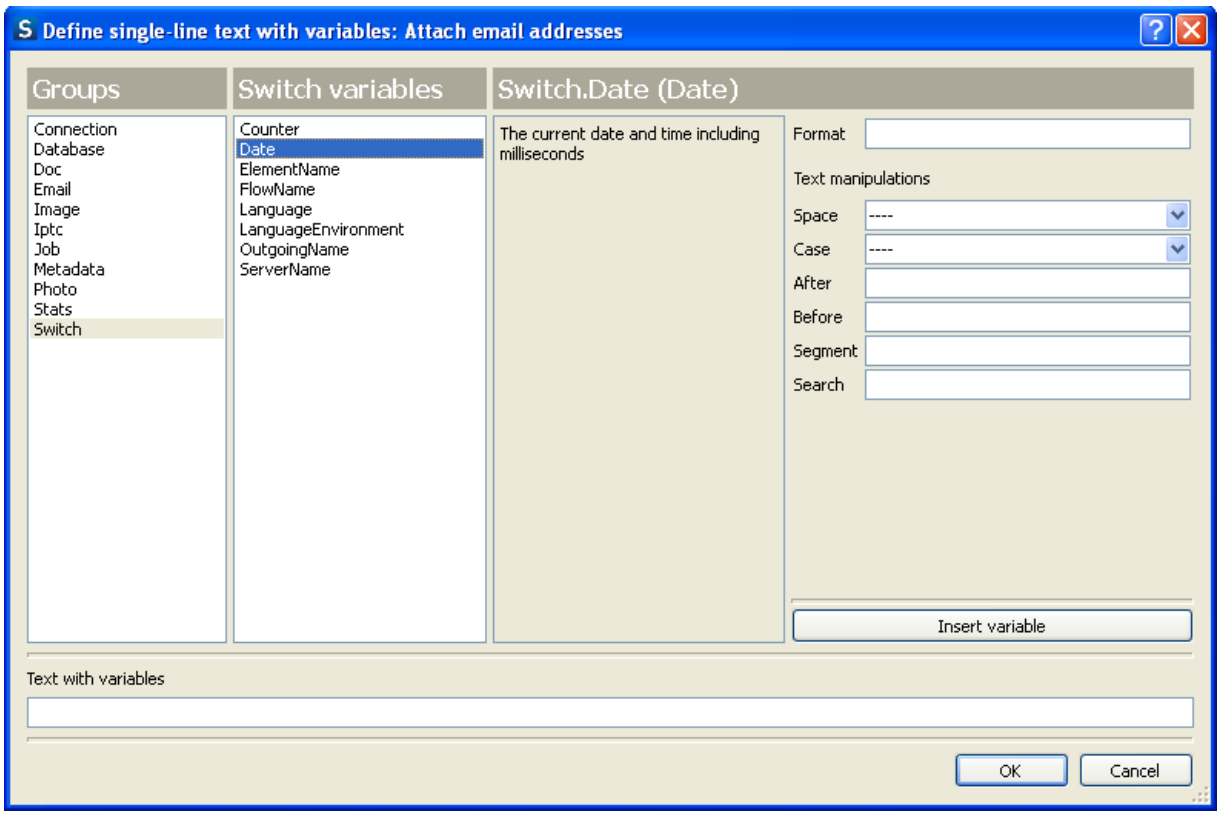
If you understand variable syntax, you can enter or modify variables directly in the text field. However, it makes more sense to let the Property editor assist you with inserting and updating variables, as explained below.

Inserting a variable

Note: Switch interprets the opening square bracket '[' as the beginning of a new variable. To use the square bracket as static text, you need to double it: '[[']. Note that there is no need to double the closing square bracket.

Example:

- **Input:** This the value of the [[Job.Name] variable: [Job.Name] *(the first instance of [Job.Name] is to be interpreted as static text; the second as a variable)*
- **Result for a job with the name TestFile.pdf:** This is the value of the [Job.Name] variable: TestFile.pdf *(only the second instance of [Job.Name] is replaced by the actual job name)*



To insert a new variable in the text, proceed as follows:

1. In the text field at the bottom, place the text cursor in the location where you'd like to insert a variable; make sure it is not inside a pair of square brackets [ ] that mark a variable; if the text field is empty, just leave the cursor at the start of the field.
2. Select a variable group in the leftmost list ("Switch" in the example above); the list to the right adjusts to list all the variables in this group.
3. Select a variable in the second list ("Date" in the example above); the text area to the right adjusts to provide a brief description of the variable, the title bar indicates the variable's data type, and the rightmost column shows any arguments relevant for this variable (see *Characteristics of variables* on page 394).
4. If the rightmost column contains any text fields, enter the appropriate values for the variable's arguments (see *Metadata* on page 425); leave a field blank to use its default value.
5. Once you are satisfied with the selected variable and argument values, click the **Insert variable** button.

Updating a variable

To update a variable that was previously inserted, proceed as follows:

1. In the text field at the bottom, place the text cursor inside the variable you would like to update, that is, inside the pair of square brackets [ ] that mark the variable; the fields in the top portion of the property editor automatically synchronize with the contents of the variable.

2. Adjust the argument values for the variable in the text fields at the right, or select a new variable (possibly in another group) as desired.
3. Once you are satisfied with the changes, click the **Update variable** button.

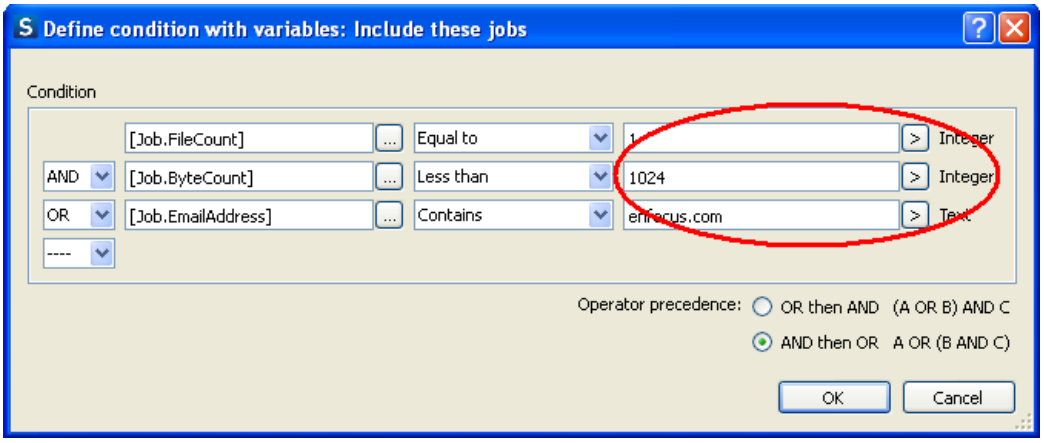
Defining a condition with variables

Conditional properties that support variables can be edited with the **Define condition with variables** property editor. A conditional property has a Boolean result (true or false). For example, the file filtering properties on connections are conditional properties.

The property editor discussed here offers a user interface to create comparison expressions with support for locating a variable and entering its arguments.

Its more advantageous to compare variables from a job with other variables (for example: from an external source like database or dataset). Therefore, Switch allows users to select multiple variables when setting up a condition. Select one of the following three property editors in the drop-down menu (highlighted in the screen given below):

- Inline Value
- Text with Variable...
- Script expression...



The example condition is true if the job being tested contains a single file smaller than 1MB or if one of the associated email addresses has the 'enfocus.com' domain.

Defining a condition

The property editor has two distinct parts:

- The main dialog box which allows defining one or more comparisons between a variable and a constant value, forming the condition.
- The pop-up dialog box which serves to locate a variable and enter its arguments, similar to defining text with variables.

The group and variable listboxes in the pop-up are synchronized with the corresponding dropdown menus for the currently selected comparison in the main dialog box.

Defining a single comparison

When the property editor for a certain property is displayed for the first time, a single comparison row is shown. To define this comparison, proceed as follows:

1. Click this button beside the first textbox. The **Define text with variables** dialog box appears.
2. Select a variable group in the first listbox. The second listbox adjusts to list all the variables in this group. Select a variable in the second listbox.
   - The text area to the right adjusts to provide a brief description of the variable, the title bar indicates the variable's data type, and the rightmost column shows any arguments relevant for this variable (see characteristics of variables).
3. Click **Insert variable** button.
   - **Define text with variables** pop-up dialog box closes.
   - The selected variable group and variable are inserted in the first textbox of the main dialog box.
4. The dropdown menu next to the textbox adjusts to list the appropriate comparison operators for the variable's data type. Select the desired comparison operator.
5. In the last dropdown menu, select the appropriate property editor. Enter or select the appropriate values.
6. Once you are satisfied with the configuration, click the **OK** button.

Defining multiple comparisons

The property editor allows defining a condition that combines multiple comparisons. Each comparison is represented as a separate row in the lower portion of the property editor. The radio button in front of each row indicate which of the comparisons is currently synchronized with the upper portion of the property editor; it is called the currently selected comparison.

The dropdown menu to the left of each row (starting with the second row) indicates the logical operator (OR or AND) used to combine the consecutive comparisons. It is also used to add and remove comparison rows.

- To add a new comparison:
  1. Locate the dropdown menu at the bottom left (in front of an empty row) displaying "----".
  2. In that dropdown menu, select the desired logical operator "AND" or "OR" instead; a new comparison row is added.
- To remove a previously added comparison:
  1. Locate the dropdown menu at the start of the comparison row displaying the logical operator "AND" or "OR".
  2. In that dropdown menu, select "----" instead; the comparison row is removed.

  You cannot remove the first condition since it does not have a logical operator dropdown menu.
- To change the logical operator combining two comparisons:

1. Locate the dropdown menu at the start of the second comparison row displaying the logical operator "AND" or "OR".
2. In that dropdown menu, select the other logical operator instead; be careful NOT to select "----" because that would cause the comparison row to be removed.

Operator precedence

If three or more comparison rows are combined with different logical operators (that is, both "AND" and "OR" are used), the meaning of the condition depends on the order in which the logical operations are performed. Thus in that case the property editor displays an extra section at the very bottom, allowing to select operator precedence:

- OR then AND: the logical OR operations are performed first, then the logical AND operations.
- AND then OR: the logical AND operations are performed first, then the logical OR operations.

The following table provides some examples of conditions with their meaning for each choice of operator precedence.

Condition	OR then AND means	AND then OR means
A OR B AND C	(A OR B) AND C	A OR (B AND C)
A OR B AND C OR D	(A OR B) AND (C OR D)	A OR (B AND C) OR D
A AND B OR C AND D	A AND (B OR C) AND D	(A AND B) OR (C AND D)
A AND B OR C OR D	A AND (B OR C OR D)	(A AND B) OR C OR D

Comparison operators

Variable data type	Comparison operators	Comparison value
Text	Equal to Not equal to Contains Does not contain Starts with Does not start with	Any text string
	Matches Does not match	A regular expression
Boolean	True False	None
Integer Rational	Equal to Not equal to Less than	A decimal integer or floating point number, example, "-12" or "0.56"

Variable data type	Comparison operators	Comparison value
	Less than or equal Greater than Greater than or equal	A constant expression using + - * / operators; example: • 5 * 1024 * 1024 • 2/3 • 6.77 + 8.55
Date	Equal to Not equal to Earlier than Earlier than or same Later than Later than or same	An ISO 8601 formatted date/time (equivalent to format string "yyyy-MM-ddThh:mm:ss.zzz") or any portion thereof. If present, the date part of the string must have one of the following formats: "yyyy-MM-dd", "yyyy-MM", "yyyy". For example, you may enter "yyyy-MM" for the format string and "2018-01" as the comparison value to compare year and month.

Sample jobs

Defining text with variables and Defining a condition with variables offer a mechanism to display actual metadata variables derived from sample jobs while configuring the property value(s) in the editor.

Limitations

A job can be a sample job only if it has a unique name prefix and a valid internal job ticket.

Sample jobs should be entered as live jobs into the flow being edited so that they can be managed by Switch and variables can be tracked.

Working with sample jobs

To benefit from this feature, you should design a prototype of the desired flow and process one or more sample jobs through the flow to the point where the jobs have accumulated the relevant metadata.

Follow these steps to work with a sample job in your flow:

1. Create a valid prototype of the desired flow.
2. Activate the flow.
3. Put the connections which are present at the end of the flow on hold to prevent jobs from completing the flow. This allows Switch to detect all the variables that are available in the sample job.
4. Place sample jobs in the flow and let them process to the desired stage.

5. Deactivate the flow.
6. Do one of the following:
   - Bring up the desired property editor that supports variables.
   - Click the **Inspect jobs** button in the toolbar.
   - Click the **Flow** > **Inspect jobs** menu option.
7. In the upper part of the dialog that pops up, select the job that you want to inspect.
8. Select the variable you want to check by clicking the appropriate item in each column. For example, if you want to check the date the job was processed by Switch (represented by the Switch.Date variable):
   - In the first column (Groups), select Switch.
   - In the second column (Switch variables), select Date.
   - In the third column, enter the format of your choice, e.g. dd.MM.yyyy

   The value is shown in the lower part of the third column. If there's no value specified, you'll see the string 'Sample value'.

Building a location path

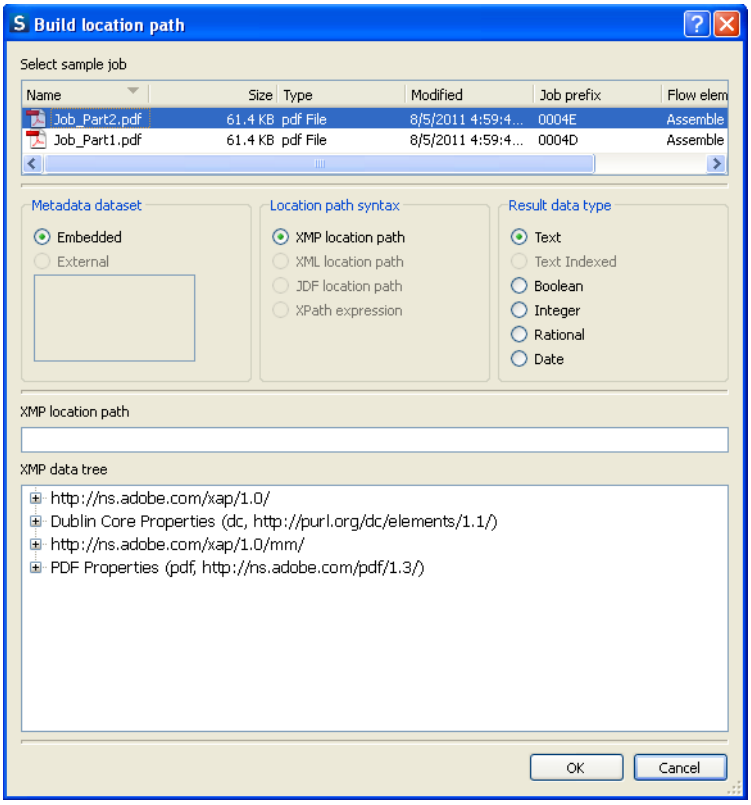
The "Build location path" dialog offers assistance with building location paths for the variables in the Metadata group using picked up metadata by a sample job. The dialog supports the various data models known in Switch.

See also *XMP location path syntax* on page 446.

Showing the dialog

The property editors **Defining text with variables** and **Defining a condition with variables** show a button called **Build location path** when a variable in the Metadata group is selected and at least one valid sample job is available (See *Working with sample jobs* on page 390).

When you click this button, the **Build location path** dialog is displayed. When you click the **OK** button after some modifications, the selected Metadata variable is updated accordingly.



Metadata dataset

This section lists the various datasets associated with the job. You can select the embedded dataset (which is always available, even if it is empty) or one of the external datasets associated with the job (if any).

Location path syntax

The data model for the selected dataset determines the available options for the location path syntax. Unavailable options are automatically disabled in the user interface.

The selected location path syntax determines the layout and behavior of the dialog's bottom portion, as described in the following sections.

Result data type

The result of the location path configured in the dialog's bottom portion (evaluated in the context of the sample document) determines which Result data type options are available. Unavailable options are automatically disabled in the user interface.

The selected Result data type determines which of the variables in the Metadata group is used to produce the result.

Location path

For the choices "XMP/XML/JDF location path" the bottom part of the dialog displays the following two items:

- An editable text field labeled "xxx location path".
- A tree view representing the metadata in the sample document, labeled "xxx data tree".

You can expand and collapse the nodes in the tree view, but the tree is not otherwise editable.

When you select a node in the tree view, the dialog displays the corresponding location path in the editable text field (discarding anything that was already there).

Vice versa, when you modify the contents of the editable text field, and the contents represents a valid location path pointing to an existing node, the dialog selects that node in the tree (and expands and scrolls the view to make it visible if needed).

The OK button is enabled only if the location path is valid and the selected node is compatible with the selected result data type; otherwise an appropriate alert message is shown at the bottom of the dialog.

XPath expression

For the choice "XPath expression" the bottom part of the dialog displays the following items:

- An editable text field labeled "XPath expression".
- A read-only text field that displays the result type and value of the expression as it is evaluated against the metadata, for example: "Integer: 5", "Boolean: false" or "Node set: 3 element nodes"
- A control bar with buttons and checkboxes (see below).
- A read-only multi-line text field that displays the XML for the sample metadata and highlights the nodes in the result node set, if any.

When you modify the contents of the editable text field, and the contents represents a valid XPath expression, the text fields are automatically updated to reflect the expression's result.

The control bar offers buttons to navigate between the nodes in a result node set, and two checkboxes that affect the XML display:

- Auto-indent: when turned on, the XML is "pretty-printed" with nested indentation.
- Color-code: when turned on, each XML node type is displayed in a different color.

The **OK** button is enabled only if the XPath expression is valid and its data type is compatible with the selected result data type; otherwise an appropriate alert message is shown at the bottom of the dialog.

5.5.3.3. Metadata reference

Variables

Using variables

Switch allows the use of variables in the values of many text properties and for defining file filters. A variable is a special, well-recognizable text string that gets replaced by a dynamic value when the flow is being executed. The dynamic value is recalculated each time in the context of the job being processed.

Variables provide access to run-time information about the flow environment and about a job, including embedded metadata fields (and external metadata fields), without the need for scripting. This lowers the barrier for accessing dynamic information in a flow definition since most users will find it is much easier to use a variable than to create a script expression.

Entering Variables

Text properties

Variables in text properties are simply mixed-in with static text. Users can insert a variable in two distinct ways:

- Directly type the variable with the appropriate syntax when entering the text; this requires understanding variable syntax.
- Use the define text with variables property editor for locating the variable and entering its arguments; the formatted variable is automatically inserted in the text.

Most users will prefer the second method; however in both cases the final result is regular text (with variables). When the value of a text property that supports variables is needed while executing a flow, Switch scans the text for variables and replaces them by their dynamic value in the context of the current job. All text outside variables remains unchanged.

Conditional properties

A conditional property has a Boolean result (true or false). For example, the file filtering properties on connections are conditional properties.

A variable-based conditional property is entered through a special property editor that offers a user interface to create basic comparison expressions with support for locating a variable and entering its arguments. See defining a condition with variables.

When the value of a condition with variables is needed while executing a flow, Switch replaces the variables by their dynamic value in the context of the current job and evaluates the expression.

Using sample jobs

The variable-related property editors (Defining text with variables and Defining a condition with variables) offer a mechanism to select a sample job and to display actual metadata values derived from that job while you are configuring (portions of) the property value in the editor.

The Build location path dialog offers assistance with building location paths for the variables in the Metadata group using actual metadata associated with a sample job.

List of variables

Switch offers a library of variables organized in groups, accessing Switch-specific flow and job information, various types of metadata embedded in or a associated with a job, and statistics derived from the file's contents.

See *Known variables* on page 402 for a complete list.

Characteristics of variables

Name

Each variable is identified by a name including the group name and the variable name proper. For example: "Switch.Counter" or "Photo.ExposureTime".

See *Basic syntax* on page 395.

Arguments

Some variables can have arguments to help determine the dynamic value or the value's formatting. For example, the "Switch.Counter" variable supports two arguments called "Width" and "Id", and the "Switch.Date" variable supports an argument called "Format".

See *Basic syntax* on page 395, *Formatting* on page 397, *Indexed variables* on page 400, *String manipulations* on page 401.

Data type

Each variable has a specific data type, which is indicated with the variable's description. The data type is important for two reasons:

- For some data types, the formatting of the variable's text representation can be influenced by specifying an appropriate argument for the variable.
- When using a variable in a condition, the data type determines the type of comparison performed.

See *Data types* on page 397, *Formatting* on page 397, *String manipulations* on page 401.

Indexed variables

Some variables access a list of values rather than a single value. These variables are called indexed variables. For example, the "Job.EmailAddress" variable accesses a list of all email addresses associated with the job.

Depending on the arguments specified with it, an indexed variable may evaluate to a concatenated list of all items (with a customizable separator) or to one particular item from the list.

See *Indexed variables* on page 400.

Basic syntax

Variable name

In its simplest form, a variable is specified as follows:

```
[Group.Variable]
```

The variable name is surrounded by square brackets. Whitespace is not allowed in the variable specification.

Variable names contain two segments separated with a period. The first segment is the group name; the second segment is the variable name within the group.

Arguments

Some variables can contain arguments that help determine the variable's dynamic value. Arguments are specified as follows:

```
[Group.Variable:ArgumentName1="Value",ArgumentName2="Value"]
```

In this example, two arguments are defined with names "ArgumentName1" and "ArgumentName2". If a variable has arguments, the variable name is followed by a colon which is followed by the arguments. For each argument, the argument name is followed by

an equal sign and the value of that argument between single or double quotes. The value can contain single quotes if it is double-quoted, or double quotes if it is single-quoted. A comma separates the arguments if there is more than one. A variable specification must not contain any whitespace except when required in a quoted argument value.

Nested variables

The Expression argument of the [Switch.Calculation] variable and the SQL arguments of Database variables can contain nested variables. These variables are used to define the value of the argument.

```
[Group.Variable:ArgumentName1="[Variable1]"]
```

Nested variables have the same syntax as the regular variables and are always surrounded by square brackets.

Some examples:

- [Switch.Calculation:Expression="[Job.Size]"]
- [Database.TextIndexed:SQL="SELECT JobName FROM Jobs",Connection="DBConnection",Separator=", "]
- [Database.Text:SQL="SELECT JobName FROM Files WHERE FileName='[Job.Name]'",Connection="DBConnection"]

Note: Nested variables are not allowed in other types of arguments. If you use them, they will be ignored and treated as regular text.

Nesting can be multi-level, i.e. nested variables can contain other nested variables.

Example:

- [Database.Text:SQL="SELECT PublisherName FROM Jobs WHERE JobName='[Database.Text:SQL="SELECT JobName FROM Files WHERE FileName='[Job.Name]'",Connection="DBConnection"]'",Connection="DBConnection"]

  (where the nested variable [Job.Name] is included in the variable [Database.Text:SQL="SELECT JobName FROM Files WHERE FileName='[Job.Name]'",Connection="DBConnection"])

Note: If used in an argument that supports nested variables, the opening square bracket '[' is interpreted by Switch as the beginning of a new variable. To use the square bracket as static text, you need to double it: '[[']'. Note that there is no need to double the closing square bracket.

Example:

- **If there is a variable** [Database.Text:SQL="SELECT [[JobName] FROM Files WHERE FileName='[Job.Name]'",Connection="DBConnection"]
- **For a job with the name TestFile.pdf**, the SQL request SELECT [JobName] FROM Files WHERE FileName='TestFile.pdf' will be executed.

See also:

- *Data types* on page 397
- *Formatting* on page 397
- *Comparing* on page 399
- *Indexed variables* on page 400
- *String manipulations* on page 401

Data types

Each variable has a specific data type, which is indicated with the variable's description. The data type is important for two reasons:

- For some data types, the formatting of the variable's text representation can be influenced by specifying an appropriate argument for the variable.
- When using a variable in a condition, the data type determines the type of comparison performed with the dynamic value.

The following table lists the supported data types for variables.

Data type	Description
Text	Text string
Alt Text	Possibly localized text string (that is, there may be multiple language versions) Switch always uses the default language; so this data type is equivalent to Text
Text Indexed	List of items of type Text (see indexed variables)
Boolean	Boolean value true or false
Integer	Integer number
Rational	Rational number formed by division of two integers
Date	A moment in time, including date and/or time information

See also:

- *Basic syntax* on page 395
- *Formatting* on page 397
- *Comparing* on page 399
- *Indexed variables* on page 400
- *String manipulations* on page 401

Formatting

The following table describes the formatting options for each data type, including:

- The default representation which is used when no formatting arguments are present.
- The supported formatting arguments, if any, and the corresponding representation.

Data type	Description of data type / Formatting argument	Representation as a text string
Text	Text string	Text string
Alt Text	Possibly localized text string	Text string (Switch always uses the default language)

Data type	Description of data type / Formatting argument	Representation as a text string
Text Indexed	List of items of type Text	See indexed variables
Boolean	Boolean value true or false	"True" or "False" (or all-lower-case versions)
Integer	Integer number	Decimal representation (including minus sign if needed; no plus sign; no leading zeroes)
Rational	Rational number formed by division of two integers	Decimal representation of the form: numerator, forward slash, denominator; example: "2/3" or "-17/4"
	Precision="integer"	Decimal floating point representation with the specified number of digits after the decimal point (minimum precision is 1, max is 15)
Date	A moment in time, including date and/or time information	String representation in the subset of the ISO 8601 format allowed in XMP Date fields (see Adobe XMP specification, version dated September 2005, page 75) Equivalent to format string "yyyy-MM-ddThh:mm:ss.zzz"
	Format="format-string"	String representation in the format specified by the format string, which must conform to the syntax described below

Date format string

The following format expressions are recognized and replaced in the date format string:

Expression	Output
d	the day as number without a leading zero (1 to 31)
dd	the day as number with a leading zero (01 to 31)
ddd	the abbreviated day name (example: 'Mon' to 'Sun')
dddd	the long day name (example: 'Monday' to 'Sunday')
M	the month as number without a leading zero (1-12)
MM	the month as number with a leading zero (01-12)
MMM	the abbreviated month name (example: 'Jan' to 'Dec')

Expression	Output
MMMM	the long month name (example: 'January' to 'December')
yy	the year as two digit number (00-99)
yyyy	the year as four digit number
h	the hour without a leading zero (0 to 23 or 1 to 12 if AM/PM display)
hh	the hour with a leading zero (00 to 23 or 01 to 12 if AM/PM display)
m	the minute without a leading zero (0 to 59)
mm	the minute with a leading zero (00 to 59)
s	the second without a leading zero (0 to 59)
ss	the second with a leading zero (00 to 59)
z	the milliseconds without leading zeroes (0 to 999)
zzz	the milliseconds with leading zeroes (000 to 999)
AP	use AM/PM display; AP will be replaced by either "AM" or "PM"
ap	use am/pm display; ap will be replaced by either "am" or "pm"
'...'	any sequence of characters enclosed in single quotes is treated as literal text

See also:

- *Basic syntax* on page 395
- *Data types* on page 397
- *Comparing* on page 399
- *Indexed variables* on page 400
- *String manipulations* on page 401

Comparing

Type of comparison

A variable's data type determines the type of comparison performed in a condition involving the variable. This is important because comparison semantics for numbers, strings and dates are very different.

Variable data type	Comparison semantics
Text	String
Alt Text	String

Variable data type	Comparison semantics
Text Indexed	String
Boolean	Boolean
Integer	Number
Rational	Number
Date	Date

Value used for comparison

When used in a condition, the variable's value is obtained in two steps:

- First the text representation of the variable is formatted as usual (see formatting); this allows influencing the value in interesting ways, such as rounding a rational number or extracting a date from a date/time.
- Then the value is converted to the data type appropriate for the comparison type (example: string, number, ...); as indicated in the table above.

See also:

- *Basic syntax* on page 395
- *Data types* on page 397
- *Formatting* on page 397
- *Indexed variables* on page 400
- *String manipulations* on page 401

Indexed variables

Some variables access a list of values rather than a single value. These variables are called indexed variables. All indexed variables support the indexing arguments described in this section.

In general, if an Index argument is provided for an indexed variable, the variable evaluates to a single value from the list. Otherwise, the variable evaluates to a sequence that contains all values in the list. The following table describes the indexing arguments and their effect in more detail.

Indexing arguments provided(don't combine!)	Description of result
None	Concatenation of all values in the list separated by a semicolon, all on the same line If there are no values, the result is the empty string
Index="integer"	The list value indicated by the specified one-based index If the Index argument is provided, all other arguments are ignored
Separator="separator-string"	Concatenation of all values in the list separated by the specified string, all on the same line

Indexing arguments provided(don't combine!)	Description of result
	If there are no values, the result is the empty string If the Separator argument is provided, the Prefix and Suffix arguments are ignored
Prefix="prefix-string" Suffix="suffix-string"	Concatenation of all values in the list, each on a separate line of the form: <prefix-string><value><suffix-string> If there are no values, the result is the empty string

Examples

Text in a property value	Evaluates to
[Job.EmailAddress:Index="1"]	tvr1@enfocus.com
[Job.EmailAddress]	tvr1@enfocus.com;tvr2@enfocus.com
[Job.EmailAddress:Separator=", "]	tvr1@enfocus.com, tvr2@enfocus.com
The email addresses for this job are: [Job.EmailAddress:Prefix=" - "]	The email addresses for this job are: - tvr1@enfocus.com - tvr2@enfocus.com

See also:

- *Basic syntax* on page 395
- *Data types* on page 397
- *Formatting* on page 397
- *Comparing* on page 399
- *String manipulations* on page 401

String manipulations

Variables of data type Text, Alt Text and Text Indexed support additional arguments to perform simple manipulations on the text value of the variable. For Indexed variables, the manipulation is performed on each item in the list (that is, before the items are sequenced).

If multiple arguments are present, the manipulations are performed in the order as they are listed in the table (regardless of the order in which they occur in the variable).

Argument	Value	Result
Space	One of "trim", "norm"	trim = leading and trailing white space removed norm = trimmed and consecutive white space compressed to a single space

Argument	Value	Result
Case	One of "upper", "lower", "first", "word"	The string converted to the specified case (first = first character is upper case, word = first character of every word is upper case)
After	Search string (non-empty)	The substring after (and not including) the last occurrence of the search string
Before	Search string (non-empty)	The substring before (and not including) the first occurrence of the search string
Segment	Start and end index (one-based) separated by a comma or a hyphen; if one of the indices is missing this indicates the start or end of the string	The substring between and including the characters indicated by the indices
Search	Regular expression (use anchors to match start or end of string)	The first substring that matches the regular expression

See also:

- *Basic syntax* on page 395
- *Data types* on page 397
- *Formatting* on page 397
- *Comparing* on page 399
- *Indexed variables* on page 400

Known variables

Switch offers a library of variables organized in groups, as listed in the table below. Follow the links in the first column in this table for a list of variables in each group, with corresponding technical reference information.

A description for each variable is displayed in the property editors for defining text with variables and defining a condition with variables. This description is not repeated in the help topics.

Group	Type of information	Source
Connection	Client connection attributes like user name, IP...	Switch settings, system environment
Database	Database fields **Note:** This group is only available if you have an active license for the Switch Databases Module.	Database (ODBC dataset)

Group	Type of information	Source
Doc	Title, keywords, author(s), copyright terms	Embedded metadata: XMP
Email	Components of the email message through which this job was originally delivered	Mail receive flow element
Image	Resolution, orientation, color mode	Embedded metadata: EXIF (TIFF tags)
Iptc	Contact, location, headline, instructions	Embedded metadata: IPTC
Job	Filename, size, email info, hierarchy info, fail info, origin	File system, internal job ticket
Metadata	Arbitrary field in any dataset associated with the job	External metadata or embedded metadata
Office	Microsoft Office variables, such as Application (Excel, PowerPoint, Word), Author, Description, Presentation Format, ...	Embedded Microsoft Office metadata
Photo	Exposure time, aperture, focus, flash	Embedded metadata: EXIF (EXIF tags)
Stats	File format, number of pages, page labels, colorants	File format & contents
Switch	Flow element name, date/time, counter	Flow definition, system environment

Connection group

These variables are Switch-specific. They provide access to the attributes of the client connection. The third column indicates the scripting API function that returns the variable's dynamic value.

Variable name	Data type	Scripting API equivalent
Connection.Email	Text	ClientConnection.getEmail()
Connection.UserName	Text	ClientConnection.getUserName()
Connection.FullUserName	Text	ClientConnection.getFullUserName()
Connection.IP	Text	ClientConnection.getIP()

Note: The variables from this group are valid only in context of a client connection. Please refer to the note in the description of the method Environment.getClientConnection(). When used without an active client connection, the

Connection variables will return empty values. This amounts to the empty string for Text variables and 0 for Integer variables.

Database variables

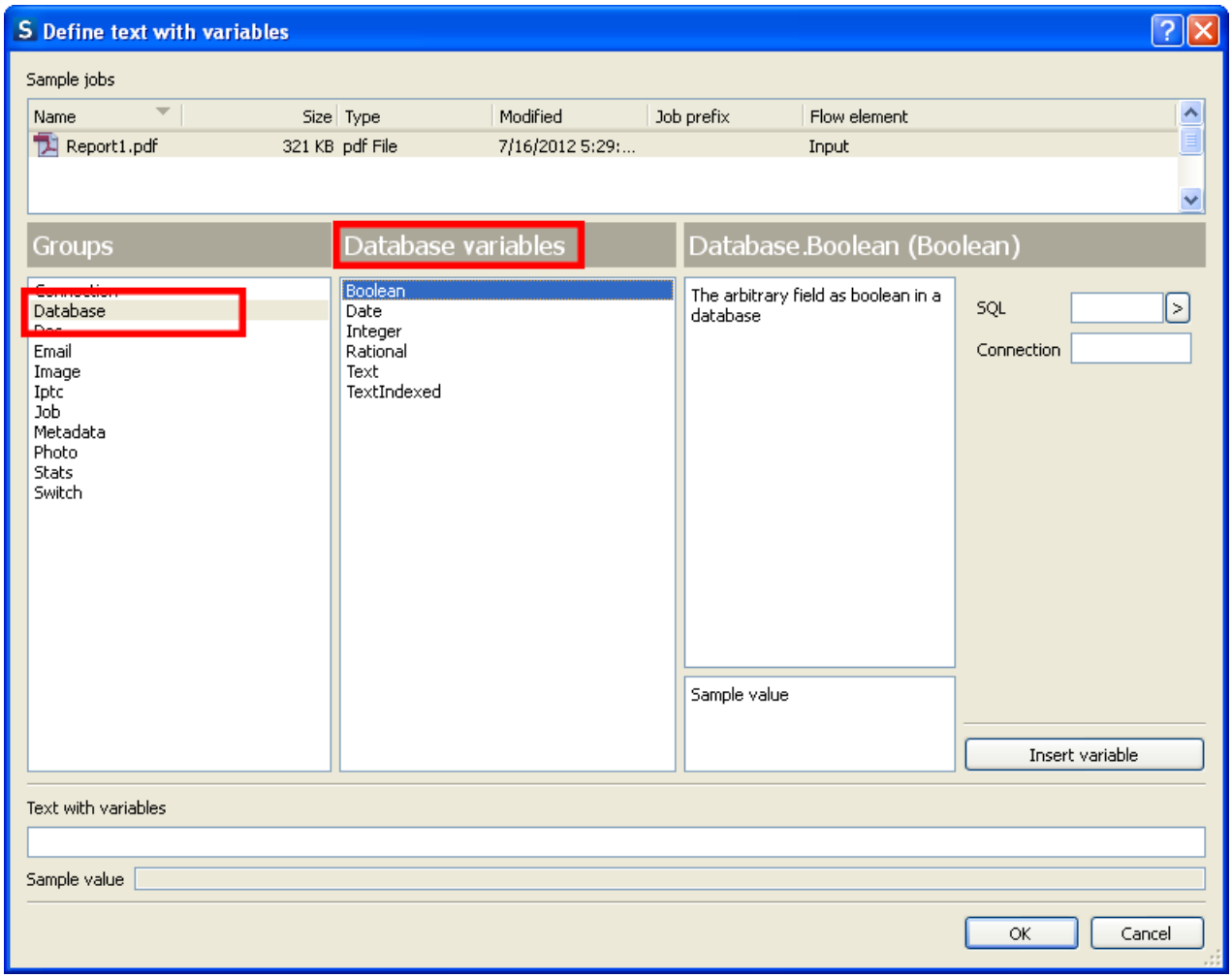
What are database variables?

Database variables are variables that at run-time are replaced with values from a database. These variables can only be used if you have an active license for the Switch Databases Module.

You can use the database variables in the same way as the regular Switch variables:

- Use them as values for the *tools and the configurator* properties.
- Use them as values for *conditions*, for example to filter jobs on a connection.
- Use them as values to fill a drop-down menu in the Submit point and Checkpoint *metadata* properties.

They are also accessible in the same way as other variables, i.e. via the **Define Text/Condition with Variables** option in the properties of the Switch tools. They are collected in a separate group: the "Database" variable group (see screenshot).



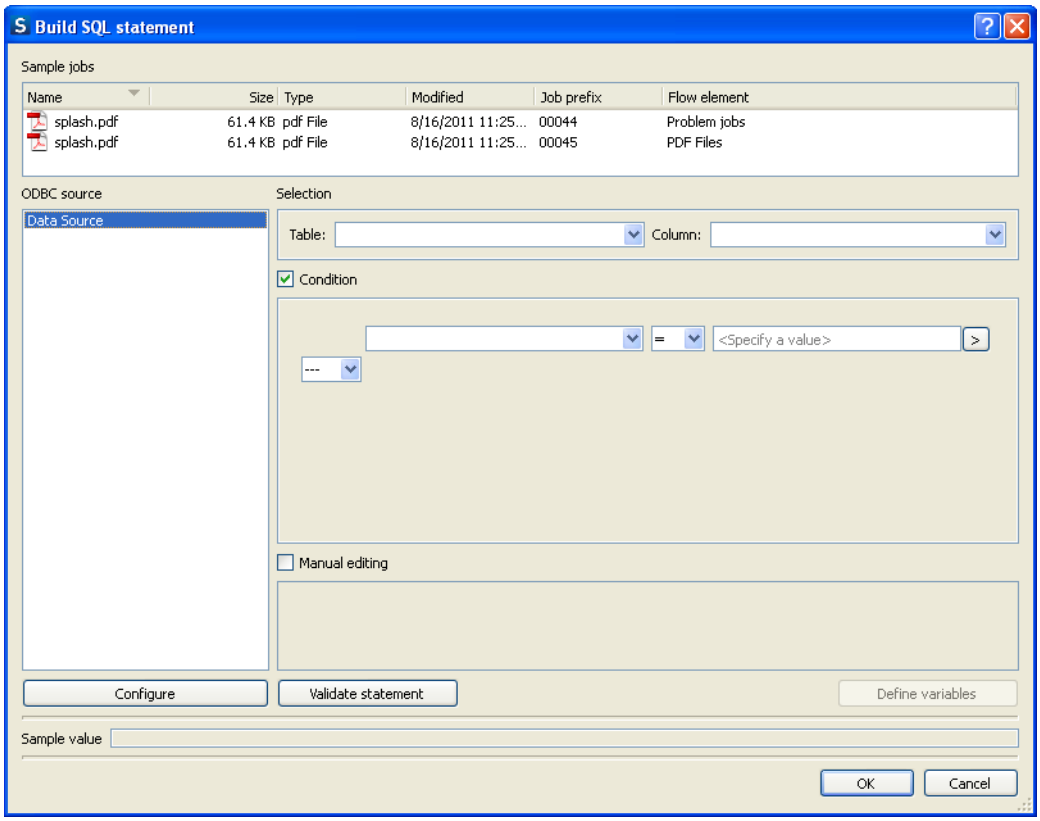
The table below lists the available data types.

Variable name	Data type
Database.Text	Text
Database.TextIndexed	Text Indexed
Database.Boolean	Boolean
Database.Integer	Integer
Database.Rational	Rational
Database.Date	Date

How to build an SQL statement?

After you have selected the Database group in the first column, and the data type in the second column, you must create an SQL statement. The Build SQL statement dialog box (see screenshot) will assist you in creating the SELECT statement and obtaining the appropriate values from the database.

Tip: We recommend using a sample job, so you can see immediately if your SQL statement is valid and correct.



To build an SQL statement, proceed as follows:

1. Click the button beside the **SQL** textbox and choose **Build SQL statement**.
2. Select a data source.
   a. Click the **Configure** button.
   b. In the **ODBC data sources** dialog, select a data source from the list of predefined data sources (Refer to *ODBC data sources* for more information on how to define the data sources).
3. Select a table and a column in the **Table** and the **Column** drop-down menus.
4. Select the **Condition** checkbox and specify or select the conditions in the first and the third menu, choose the comparison operator in the middle drop-down menu and choose the AND or OR logical operator in the last drop-down menu.
5. Alternatively, in order to choose more than one column or to choose a column from any other table or not to choose any columns, select the **Manual editing** checkbox and enter the statement manually.
6. After setting the SQL statement, click the **Validate statement** button to check if the query is valid. If the query returns any value or error, it is displayed on screen. The **Sample value** menu displays the sample value for a query. If a query returns multiple values, they will be listed in a comma separated list. For example: "val11,val12,val21,val22...".
7. Click the **OK** button to insert the statement.

Doc group

These variables access embedded metadata fields in the Adobe XMP format. The third column indicates the XMP location path for the variable in the XMP data model.

The metadata fields accessed by the variables in this table can be viewed and edited using the "File > File Info..." dialog in Adobe Creative Suite applications. The fourth column indicates the label of the field that corresponds to each variable.

The "Alt Text" data type indicates a possibly localized text string (that is, there may be multiple language versions). Switch always uses the default language; so this data type is equivalent to Text.

Variable name	Data type	XMP location path	Acrobat Document Properties label	Photoshop File Info label
Doc.Application	Text	xmp:CreatorTool	Application	Description / Application
Doc.Author	Text	dc:creator/*[1]		Description / Author
Doc.Authors	Text Indexed	dc:creator	Author	Description / Author
Doc.AuthorTitle	Text	photoshop: AuthorsPosition		Description / Author Title
Doc.Category	Text	photoshop: Category		Categories / Category

Variable name	Data type	XMP location path	Acrobat Document Properties label	Photoshop File Info label
Doc.City	Text	photoshop:City		Origin / City IPTC Image / City
Doc.Copyright Notice	Alt Text	dc:rights		Description / Copyright Notice
Doc.Copyright Status	Boolean	xapRights: Marked		Description / Copyright Status
Doc.Copyright Terms	Alt Text	xapRights: UsageTerms		IPTC Status / Rights Usage Terms
Doc.Copyright URL	Text	xapRights: WebStatement		Description / Copyright Info URL
Doc.Country	Text	photoshop: Country		IPTC Image / Country
Doc.Created	Date	xmp:CreateDate		Description / Created
Doc.Credit	Text	photoshop:Credit		Origin / Credit IPTC Status / Provider
Doc.DateCreated	Date	photoshop: DateCreated	Created	Origin / Date Created
Doc.Description	Alt Text	dc:description	Subject	Description / Description
Doc.Description Writer	Text	photoshop: CaptionWriter		Description / Description Writer
Doc.Format	Text	dc:format		Description / Format
Doc.Headline	Text	photoshop: Headline		Origin / Headline IPTC Content / Headline
Doc.Instructions	Text	photoshop: Instructions		Origin / Instructions IPTC Status / Instructions
Doc.Keywords	Text Indexed	dc:subject	Keywords	Description / Keywords

Variable name	Data type	XMP location path	Acrobat Document Properties label	Photoshop File Info label
Doc.Modified	Date	xmp:ModifyDate	Modified	Description / Modified
Doc.Source	Text	photoshop: Source		Origin / Source IPTC Status / Source
Doc.State	Text	photoshop:State		Origin / State-Province IPTC Image / State
Doc. Supplemental Categories	Text Indexed	photoshop: Supplemental Categories		Categories / Supplemental Categories
Doc.Title	Alt Text	dc:title	Title	Description / Document Title
Doc. Transmission Reference	Text	photoshop: Transmission Reference		Origin / Transmission Reference IPTC Status / Job
Doc.Urgency	Integer	photoshop: Urgency		Origin / Urgency

Email group

These variables access the components of the email message through which this job was originally delivered. The values are empty if the job was not delivered via email or if the email message did not contain the requested component.

The Mail receive flow element associates this information with the job as a metadata dataset. Refer to *Email message schema* on page 434 for details on the format of this metadata. The third column in the table lists the element name in this schema corresponding to each variable.

(*) See email message schema.

Variable name	Data type	Element name (*)
Email.Body	Text	body
Email.Cc	Text	cc
Email.Date	Text	date
Email.From	Text	from
Email.MessageId	Text	message-id

Variable name	Data type	Element name (*)
Email.ReplyTo	Text	reply-to
Email.Sender	Text	sender
Email.Subject	Text	subject
Email.To	Text	to

Image group

These variables access embedded metadata fields in the EXIF format (synchronized with Adobe XMP). The third column indicates the hexadecimal TIFF tag corresponding to each variable.

Variable name	Data type	XMP location path	TIFF tag
Image.Artist	Text	tiff:Artist & dc:creator/*[1]	0x013B
Image.ColorMode	Integer	photoshop:ColorMode	--
Image.Copyright	Alt Text	tiff:Copyright & dc:rights	0x8298
Image.DateTime	Date	tiff:DateTime & xmp:ModifyDate	0x0132 & 0x9290
Image.ICCProfile	Text	photoshop:ICCProfile	--
Image.ImageDescription	Alt Text	tiff:ImageDescription & dc:description	0x010E
Image.ImageLength	Integer	tiff:ImageLength	0x0101
Image.ImageWidth	Integer	tiff:ImageWidth	0x0100
Image.Make	Text	tiff:Make	0x010F
Image.Model	Text	tiff:Model	0x0110
Image.Orientation	Integer	tiff:Orientation	0x0112
Image.Photometric Interpretation	Integer	tiff:Photometric Interpretation	0x0106
Image.ResolutionUnit	Integer	tiff:ResolutionUnit	0x0128
Image.SamplesPerPixel	Integer	tiff:SamplesPerPixel	0x0115
Image.Software	Text	tiff:Software & xmp:CreatorTool	0x0131
Image.XResolution	Rational	tiff:XResolution	0x011A

Variable name	Data type	XMP location path	TIFF tag
Image.YResolution	Rational	tiff:YResolution	0x011B

IPTC group

These variables access embedded metadata fields in the IPTC format (synchronized with Adobe XMP). The third column indicates the XMP location path for the variable in the XMP data model. The Iptc4xmpCore prefix has been omitted in the location paths.

The metadata fields accessed by the variables in this table can be viewed and edited using the **File > File Info...** dialog box in Adobe Creative Suite applications. The fourth column indicates the label of the field that corresponds to each variable.

(*) The Iptc4xmpCore prefix has been omitted in the location paths.

Variable name	Data type	XMP location path (*)	Photoshop File Info label
Iptc.City	Text	photoshop:City	IPTC Image / City
Iptc.ContactAddress	Text	CreatorContactInfo/ CiAdrExtadr	IPTC Contact / Address
Iptc.ContactCity	Text	CreatorContactInfo/ CiAdrCity	IPTC Contact / City
Iptc.ContactCountry	Text	CreatorContactInfo/ CiAdrCtry	IPTC Contact / Country
Iptc.ContactEmail	Text	CreatorContactInfo/ CiEmailWork	IPTC Contact / E-mail(s)
Iptc.ContactPCode	Text	CreatorContactInfo/ CiAdrPcode	IPTC Contact / Postal Code
Iptc.ContactPhone	Text	CreatorContactInfo/ CiTelWork	IPTC Contact / Phone(s)
Iptc.ContactState	Text	CreatorContactInfo/ CiAdrRegion	IPTC Contact / State-Province
Iptc.ContactWebsite	Text	CreatorContactInfo/ CiUrlWork	IPTC Contact / Website(s)
Iptc.CopyrightNotice	Alt Text	dc:rights	IPTC Status / Copyright Notice
Iptc.Country	Text	photoshop:Country	IPTC Image / Country
Iptc.CountryCode	Text	CountryCode	IPTC Image / ISO Country Code
Iptc.Creator	Text	dc:creator/*[1]	IPTC Contact / Creator

Variable name	Data type	XMP location path (*)	Photoshop File Info label
Iptc.CreatorJobTitle	Text	photoshop:Authors Position	IPTC Contact / Creator's Job Title
Iptc.DateCreated	Date	photoshop:DateCreated	IPTC Image / Date Created
Iptc.Description	Alt Text	dc:description	IPTC Content / Description
Iptc.Description Writer	Text	photoshop:CaptionWriter	IPTC Content / Description Writer
Iptc.Headline	Text	photoshop:Headline	IPTC Content / Headline
Iptc.Instructions	Text	photoshop:Instructions	IPTC Status / Instructions
Iptc.Intellectual Genre	Text	IntellectualGenre	IPTC Image / Intellectual Genre
Iptc.JobID	Text	photoshop: TransmissionReference	IPTC Status / Job Identifier
Iptc.Keywords	Text Indexed	dc:subject	IPTC Content / Keywords
Iptc.Location	Text	Location	IPTC Image / Location
Iptc.Provider	Text	photoshop:Credit	IPTC Status / Provider
Iptc.RightsUsage Terms	Alt Text	xmpRights:UsageTerms	IPTC Status / Rights Usage Terms
Iptc.Scene	Text Indexed	Scene	IPTC Image / IPTC Scene
Iptc.Source	Text	photoshop:Source	IPTC Status / Source
Iptc.State	Text	photoshop:State	IPTC Image / State-Province
Iptc.SubjectCode	Text Indexed	SubjectCode	IPTC Content / IPTC Subject Code
Iptc.Title	Alt Text	dc:title	IPTC Status / Title

Job group

These variables are Switch-specific. The third column indicates the scripting API function that returns the variable's dynamic value.

Variable name	Data type	Scripting API equivalent
Job.ByteCount	Integer	Job.getByteCount()
Job.EmailAddress	Text Indexed	Job.getEmailAddresses()
Job.Extension	Text	Job.getExtension()
Job.FileCount	Integer	Job.getFileCount()
Job.Hierarchy	Text Indexed	Job.getHierarchyPath()
Job.IsFile	Boolean	Job.isFile()
Job.IsFolder	Boolean	Job.isFolder()
Job.JobState	Text	Job.getJobState()
Job.Name	Text	Job.getName()
Job.NameProper	Text	Job.getNameProper()
Job.Path	Text	Job.getPath()
Job.Priority	Integer	Job.getPriority()
Job.PrivateData	Text	Job.getPrivateData()
Job.Size	Text	--
Job.UniqueNamePrefix	Text	Job.getUniqueNamePrefix()
Job.UserEmail	Text	The user's email address associated with the job (as entered in the Users pane). If no user information has been linked to the job, the variable remains empty. Job.getUserEmail()
Job.UserFullName	Text	The user's full name associated with the job (as entered in the Users pane). If no user information has been linked to the job, the variable remains empty. Job.getUserFullName()
Job.UserName	Text	Job.getUserName()
Job.FileCreationDate	Date	The creation date/time of the job file or folder as taken from file system File(job.getPath()).created

Variable name	Data type	Scripting API equivalent
Job.EmailBody	Text	The email body text in the email info associated with the job Job.getEmailBody()
Job.NestedName Indent=" "	Text Indexed	A list of indented names (including extension) for all files and folders in the job; by default each level indents with 4 spaces; on a particular level names are sorted alphabetically; see example below The Indent argument specifies the string added for each indentation level (default value is 4 spaces) Script that recursively iterates over job contents

Nested name example:

The variable [Job.NestedName:Prefix="-> ",Indent=". "] might be replaced by the following lines:

```
-> My job folder
-> . First.pdf
-> . Second.pdf
-> . Subfolder
-> . . Readme.txt
-> . Third.pdf
```

The following variables access a job's occurrence trail to provide information on the job's origin and on why the job was sent to the problem jobs folder. Each of the variables access the most recent occurrence of a particular type, as listed in the table.

Variable name	Data type	Most recent occurrence of type	Scripting API equivalent
Job.FailElement	Text	Failed	Occurrence.getElement()
Job.FailFlow	Text	Failed	Occurrence.getFlow()
Job.FailMessage	Text	Failed	Occurrence.getLocalizedMessage()
Job.FailModule	Text	Failed	Occurrence.getModule()
Job.FailTime	Date	Failed	Occurrence.getTimeStamp()
Job.Origin	Text	Produced	Occurrence.getOrigin()

Job.Origin

Use this variable to get **the original location of the job before it was injected or submitted into the flow**:

- For a **Submit point**, this is the original file path of the job submitted to Switch via legacy version of SwitchClient or the path to backing folder of the Submit point if the job has been submitted via the Switch Web Portal.
- For an **FTP receive** element, this is the path to the file on FTP server that was used to download the file.
- For a **Mail receive** element, this is the 'From' address of the email.
- For a **Script** element, this is the path that was passed into "createNewJob". Note that the "createNewJob" function can be called with or without a path parameter, so it's up to the script writer to provide the Job.Origin value or to leave it empty.

Note: For other elements, this variable is empty!

Metadata group

These variables allow access to an arbitrary field in any dataset associated with the job (external metadata or embedded metadata).

There is a variable for each data type supporting the appropriate formatting and/or indexing arguments. This enables the user to express the expected data type for the metadata value and control its formatting.

Variable name	Data type
Metadata.Text	Text
Metadata.TextIndexed	Text Indexed
Metadata.Boolean	Boolean
Metadata.Integer	Integer
Metadata.Rational	Rational
Metadata.Date	Date

Selecting a data field

The variables in the Metadata group support the following arguments for selecting a particular metadata field from a particular dataset.

Argument	Value
Dataset	The name of the external dataset to be accessed, or empty/missing to indicate the embedded dataset
Model	The data model used for querying the data set; when empty/missing the data model is derived from the dataset; allowed values are "XML", "JDF" and "XMP"

Argument	Value
	This argument can be omitted except when forcing a JDF data model to be queried using regular XML semantics (that is, using "evalToString" rather than "getString")

Path	The location path or expression for selecting a field (or calculating a value) using syntax appropriate for the data model:
	• XML: XPath expression (which includes XPath location paths)
	• JDF: JDF location path (which is really the same as an XPath location path)
	• XMP: XMP location path
	• All prefixes used in the location path or expression must occur in the default namespace map for the data set; there is no way to specify explicit mappings.
	Make sure to use the correct prefix:
	For the XML data model, use the prefix "dn", for example:
	`[Metadata.Text:Path="/dn:XML/dn:ResourcePool/dn:CustomerInfo/@DescriptiveName",Dataset="Xml",Model="XML"]`
	For the JDF data model, use the prefix "jdf", for example:
	`[Metadata.Text:Path="/jdf:JDF/jdf:ResourcePool/jdf:CustomerInfo/@DescriptiveName",Dataset="Jdf",Model="JDF"]`
	For more information, refer to "XML data model" and "JDF data model" in the Switch Scripting Guide, available on the Enfocus website.

Data type conversions

Switch does not guarantee that the value of a variable in the Metadata category conforms to the string representation of its data type. The user is responsible for selecting the correct data type by using the appropriate variable in the Metadata category.

The variable is always set to the string value of the query (for Text Indexed, each item in the list is converted separately).

In other words:

- For the JDF and XMP data models there is never a conversion, because the result of the query is always a string (the text content of the node specified by the location path).
- For the XML data model, the result of the XPath expression is converted to a string using XPath semantics (unless it was a string to begin with).

Office group

These variables access metadata fields embedded in Microsoft Office documents (Excel files, Word documents, PowerPoint presentations).

Note: If a Microsoft Office document is password protected, Switch has no access to the metadata, hence these variables cannot be used.

Variable name	Data type	Description
Office.Application	Text	Name of the application that created the document, for example: *Microsoft Office Word*
Office.AppVersion	Text	Version of the application that created the document; string of the form XX.YYYY (X and Y representing numerical values), for example: *14.0000*
Office.Author	Text	Author of the document
Office.Category	Text	Category of the document
Office.Company	Text	Name of a company associated with the document
Office.ContentStatus	Text	Status of the document content, for example: *Draft*, *Reviewed*, *Final*, ...
Office.ContentType	Text	Type of document content, for example: *Whitepaper*, *Security Bulletin*, *Exam*, ...
Office.Created	Date	Date and time when the document was created, for example: *2014-02-05T10:10:36.000Z*. You can modify the format, for example: *dd:MM:yy mm:ss (UTC time zone)* will result in *05:02:14 10:36*
Office.Custom	Text	The metadata value selected from the document using XPath expression provided in the 'Path' argument. The argument 'Set' defines the metadata set where the required value is searched for. The possible values for the 'Set' argument are 'Core' and 'Extended' (used as the default value). For more details, refer to the section below.
Office.Description	Text	Textual description of the document
Office.DocSecurity	Integer	Security level of the document: • 0 = None • 1 = Document is password protected • 2 = Document is recommended to be opened as read-only • 4 = Document must be opened as read-only • 8 = Document is locked for annotation
Office.HyperlinkBase	Text	Base string used for evaluating relative hyperlinks in this document

Variable name	Data type	Description
Office.HyperlinksChanged	Boolean	Indicates whether or not hyperlinks were changed: • True = One or more hyperlinks in this part were updated exclusively in this part by a producer • False = No hyperlinks were updated
Office.Identifier	Text	Identifier of the document
Office.Keywords	Text	Keywords that specify the topic of the document
Office.Language	Text	Language of the document
Office.LinksUpToDate	Boolean	State of the hyperlinks in the document: • True = Hyperlinks are up-to-date • False = Hyperlinks are outdated
Office.Manager	Text	Name of a supervisor associated with the document
Office.Modified	Date	Date and time when the document was last modified
Office.ModifiedBy	Text	Author of the last modification in the document
Office.NumberOfCharacters	Integer	Total number of characters in the document
Office.NumberOfCharacters WithSpaces	Integer	Last count of the number of characters (including spaces) in this document
Office.NumberOfHiddenSlides	Integer	Number of hidden slides in the presentation
Office.NumberOfLines	Integer	Total number of lines in the document when last saved by a conforming producer
Office.NumberOfMMClips	Integer	Total number of sound or video clips that are present in the document
Office.NumberOfNotes	Integer	Number of slides in the presentation containing notes
Office.NumberOfPages	Integer	Total number of pages in the document
Office.NumberOfParagraphs	Integer	Total number of paragraphs found in the document
Office.NumberOfSlides	Integer	Total number of slides in the presentation

Variable name	Data type	Description
Office.NumberOfWords	Integer	Total number of words in the document when the document was last saved
Office.PresentationFormat	Text	Intended format for the presentation, for example a presentation intended to be shown on video has PresentationFormat *Video*, a presentation to be shown on screen, could have *On-screen (4:3)*, ...
Office.Printed	Date	Date and time when the document was last printed
Office.Revision	Integer	Revision number
Office.ScaleCrop	Boolean	Display mode of the document thumbnail: • True = Thumbnail is scaled to fit the display • False = Thumbnail is cropped to show only sections that fit the display
Office.SharedDoc	Boolean	Indicates whether or not the document is shared: • True = Document is currently shared between multiple producers • False = Document is not shared
Office.Subject	Text	Subject of the document
Office.Template	Text	Name of an external document template containing format and style information used to create the document.
Office.Title	Text	Title of the document
Office.TotalTime	Integer	Total time that the document has been edited. The default time unit is minutes.
Office.Version	Integer	Version number

Office.Custom

Use this variable if there is a metadata tag in your Office document that does not have a dedicated Switch variable. The [Office.Custom] variable allows you to retreive the value of this tag, on condition that you have the correct XPath expression. Note that the data type of this variable is 'Text', so only text manipulation arguments are available for it.

The metadata value is selected from the document using the XPath expression provided in the **Path** argument. All prefixes used in the expression must occur in the default namespace map for the metadata XML file. There is no way to specify explicit mappings. The default namespace is automatically available using prefix 'dn'.

The argument **Set** defines the metadata set where the required value is searched for. The possible values are 'Core' and 'Extended' (used as the default value):

- The 'Core' set corresponds to the document properties (normally located in the file docProps/core.xml). Normally, the XPath for this set will begin with '/cp:coreProperties'.
- The 'Extended' set contains extended properties (normally located in the file docProps/app.xml). The XPath begins with '/dn:Properties' where 'dn' is the prefix for the default namespace, automatically provided by Switch.

Examples

```
[Office.Custom:Path="/dn:Properties/dn:Application"] - This gives the same result as
 [Office.Application]
[Office.Custom:Path="/dn:Properties/dn:TitlesOfParts/vt:vector/
vt:lpstr[1]",Set="Extended"] - The title of some document part
[Office.Custom:Path="/cp:coreProperties/dc:title",Set="Core"] - This gives the same
 result as [Office.Title]
```

More information about the Office Open XML format and its metadata can be found here: *http://en.wikipedia.org/wiki/Office_Open_XML_file_formats*.

Photo group

These variables access embedded metadata fields in the EXIF format (synchronized with Adobe XMP). The third column indicates the hexadecimal EXIF tag corresponding to each variable.

Variable name	Data type	XMP location path	EXIFF tag
Photo.ApertureValue	Rational	exif:ApertureValue	0x9202
Photo.BrightnessValue	Rational	exif:BrightnessValue	0x9203
Photo.ColorSpace	Integer	exif:ColorSpace	0xA001
Photo.CompressedBitsPer Pixel	Rational	exif:CompressedBitsPerPixel	0x9102
Photo.Contrast	Integer	exif:Contrast	0xA408
Photo.CustomRendered	Integer	exif:CustomRendered	0xA401
Photo.DateTimeDigitized	Date	exif:DateTimeDigitized	0x9004 & 0x9292
Photo.DateTimeOriginal	Date	exif:DateTimeOriginal	0x9003 & 0x9291
Photo.DigitalZoomRatio	Rational	exif:DigitalZoomRatio	0xA404
Photo.ExposureBiasValue	Rational	exif:ExposureBiasValue	0x9204
Photo.ExposureIndex	Rational	exif:ExposureIndex	0xA215
Photo.ExposureMode	Integer	exif:ExposureMode	0xA402
Photo.ExposureProgram	Integer	exif:ExposureProgram	0x8822

Variable name	Data type	XMP location path	EXIFF tag
Photo.ExposureTime	Rational	exif:ExposureTime	0x829A
Photo.FlashEnergy	Rational	exif:FlashEnergy	0xA20B
Photo.FlashFired	Boolean	exif:Flash/exif:Fired	0x9209 bits
Photo.FlashFunction	Boolean	exif:Flash/exif:Function	0x9209 bits
Photo.FlashMode	Integer	exif:Flash/exif:Mode	0x9209 bits
Photo.FlashRedEyeMode	Boolean	exif:Flash/exif:RedEyeMode	0x9209 bits
Photo.FlashReturn	Integer	exif:Flash/exif:Return	0x9209 bits
Photo.FNumber	Rational	exif:FNumber	0x829D
Photo.FocalLength	Rational	exif:FocalLength	0x920A
Photo.FocalLengthIn35mm Film	Integer	exif:FocalLengthIn35mmFilm	0xA405
Photo.FocalPlane ResolutionUnit	Integer	exif:FocalPlaneResolutionUnit	0xA210
Photo.FocalPlaneX Resolution	Rational	exif:FocalPlaneXResolution	0xA20E
Photo.FocalPlaneX Resolution	Rational	exif:FocalPlaneYResolution	0xA20F
Photo.GainControl	Integer	exif:GainControl	0xA407
Photo.ImageUniqueID	Text	exif:ImageUniqueID	0xA420
Photo.ISOLatitude	Integer	exif:ISOSpeedRatings/*[2]	0x8827
Photo.ISOSpeed	Integer	exif:ISOSpeedRatings/*[1]	0x8827
Photo.Lens	Text	aux:Lens	--
Photo.LightSource	Integer	exif:LightSource	0x9208
Photo.MaxApertureValue	Rational	exif:MaxApertureValue	0x9205
Photo.MeteringMode	Integer	exif:MeteringMode	0x9207
Photo.PixelXDimension	Integer	exif:PixelXDimension	0xA002
Photo.PixelYDimension	Integer	exif:PixelYDimension	0xA003

Variable name	Data type	XMP location path	EXIFF tag
Photo.Saturation	Integer	exif:Saturation	0xA409
Photo.SceneCaptureType	Integer	exif:SceneCaptureType	0xA406
Photo.SensingFunction	Integer	exif:SensingFunction	0xA217
Photo.Sharpness	Integer	exif:Sharpness	0xA40A
Photo.ShutterSpeedValue	Rational	exif:ShutterSpeedValue	0x9201
Photo.SpectralSensitivity	Text	exif:SpectralSensitivity	0x8824
Photo.SubjectDistance	Rational	exif:SubjectDistance	0x9206
Photo.SubjectDistance Range	Integer	exif:SubjectDistanceRange	0xA40C
Photo.UserComment	Alt Text	exif:UserComment	0x9286
Photo.WhiteBalance	Integer	exif:WhiteBalance	0xA403

Stats group

These variables access statistics derived from the actual file contents for a number of supported file formats. The values are empty for a job in an unsupported file format and for a job folder.

File format

For a list of supported file formats, please refer to the description of the FileStatistic class in the Scripting documentation available on the Enfocus website.

Variable name	Data type	Scripting API equivalent
Stats.FileFormat	Text	FileStatistics.getFileFormat()

Content statistics

The Stats group includes an additional variable for each additional statistic supported by the FileStatistics class (see Supported statistics). The variable has the same name and data type as the statistic (where string maps to Text and string list maps to Text Indexed).

Variable name	Data type	Supported for
Stats.NumberOfPages	Integer	All supported formats
Stats.SamplesPerPixel	Integer	JPEG, TIFF, PNG
Stats.PixelXDimension	Integer	JPEG, TIFF, PNG
Stats.PixelYDimension	Integer	JPEG, TIFF, PNG

Variable name	Data type	Supported for
Stats.ColorMode	Integer	JPEG, TIFF, PNG
Stats.ColorSpace	Integer	JPEG, TIFF, PNG
Stats.ICCProfile	Text	JPEG, TIFF, PNG
Stats.Colorants	Text Indexed	TIFF
Stats.CellWidth	Integer	TIFF
Stats.CellLength	Integer	TIFF
Stats.TileWidth	Integer	TIFF
Stats.TileLength	Integer	TIFF
Stats.ColorIntent	Integer	PNG
Stats.Version	Text	PDF
Stats.PageWidth	Rational	PDF
Stats.PageHeight	Rational	PDF
Stats.PageLabels	Text Indexed	PDF
Stats.Colorants	Text Indexed	PDF
Stats.Fonts	Text Indexed	PDF
Stats.SecurityMethod	Text	PDF
Stats.PageBoxesEqual	Boolean	PDF
Stats.MediaBoxWidth	Integer	PDF
Stats.MediaBoxHeight	Integer	PDF
Stats.CropBoxWidth	Integer	PDF
Stats.CropBoxHeight	Integer	PDF
Stats.BleedBoxWidth	Integer	PDF
Stats.BleedBoxHeight	Integer	PDF
Stats.TrimBoxWidth	Integer	PDF
Stats.TrimBoxHeight	Integer	PDF

Variable name	Data type	Supported for
Stats.ArtBoxWidth	Integer	PDF
Stats.ArtBoxHeight	Integer	PDF
Stats.PDFXVersionKey	Text	PDF
Stats.ColorSpaceFamilies	Text Indexed	PDF
Stats.TransparentColor	Boolean	PDF
Stats.FontTypes	Text Indexed	PDF

Note: The FileStatistics class allows reading both defined and effective values of PDF page (and page boxes) width and height. The corresponding variables from the Stats group support this by providing the 'Type' argument with possible values 'Defined' and 'Effective'.

Switch group

These variables are Switch-specific. The third column indicates the scripting API function that returns the variable's dynamic value.

Variable name	Data type	Scripting API equivalent
Switch.Calculation	Rational	This allows you to use variables (that are by default treated as text) to do calculations. It is also possible to manually enter this syntax while selecting other variables. Therefore, you can perform calculations on variables that result in a number anywhere in the Switch application, provided you have access to the variables pane from there. The 'Expression' argument specifies the arithmetic expression to be calculated. The expression may contain other Switch variables, constant numbers, parentheses, the arithmetic operators ('+', '-', '*', '/' and '%') and the 'round' function. Note that the behavior of the round() function (which rounds the value of a number to the nearest integer) is sometimes different from Excel. For example, -10,5 is rounded to -10 (< >Excel: -11). Example of the Calculation variable syntax : [Switch.Calculation:Expression = "[Stats.PageHeight]

Variable name	Data type	Scripting API equivalent
		*0.352777778",Precission="1"] x [Switch.Calculation:Expression = "[Stats.PageWidth] *0.352777778",Precission="1"]
Switch.Counter	Text	-- (see below)
Switch.Date	Date	-- (the current date/time)
Switch.ElementName	Text	Switch.getElementName()
Switch.FlowName	Text	Switch.getFlowName()
Switch.Language	Text	Environment.getLanguage()
Switch.LanguageEnvironment	Text	Environment.getLanguageEnvironment()
Switch.ServerName	Text	Environment.getServerName()
Switch.OutgoingName	Text Indexed	A list of names for the outgoing connections in alphabetical order; if a connection name is empty the target folder name is used as a fallback; if the folder name is empty as well, the connection is not listed Script that iterates over connections, determines the (fallback) name and sorts the list

Note:

- Switch.OutgoingName cannot be used to define metadata fields in Checkpoints and Submit points.

Counter operation

The Switch.Counter variable evaluates to an automatically incrementing decimal integer with a fixed number of digits. For example, if the variable has never been used before, it will evaluate to "00001". Next time, it will evaluate to "00002" and so forth. After the counter reaches "99999" it circles back to "00000".

The most recently used value of the counter is retained across multiple invocations of the Switch Server.

Counter: number of digits

The Width argument specifies the number of decimal digits in the number; leading zeroes are inserted when needed. The default value for width is 5; the minimum value is 1 and the maximum value is 15. An invalid value is replaced by the nearest valid value.

The internal counter is always 15 digits wide; the Width argument specifies how many of the right-most digits are actually shown.

Identifying counters

A counter variable refers to a particular physical counter through an identifier (ID). Switch uses the same physical counter for all counter variables with the same ID, even if these variables are used in properties of a different flow element or in a different flow (in the same Switch instance). A physical counter is incremented each time a counter variable with its ID is evaluated, regardless of where the variable occurred.

A counter variable can explicitly specify an ID or it can rely on the default value.

If the "ID" argument is present and has a non-empty value, this explicitly specifies the ID. Otherwise a default ID is generated that is unique to the flow element in which the counter is used. This makes the counter variable "local".

If a property uses the same counter variable more than once, each invocation of the variable is deemed a new invocation and will cause the counter to be incremented. For example, assuming no counters have been used yet in a flow element, the property value

```
Demo [Switch.Counter] - [Switch.Counter]
```

evaluates to

```
Demo 00001 - 00002
```

Metadata

Embedded metadata

Switch offers direct access to metadata embedded in a job in the EXIF, IPTC and Adobe XMP formats, without the need for a separate "pick-up" action. Switch provides read-only access to embedded metadata through variables and read-write access to embedded metadata through scripting.

Also see "Metadata overview".

Embedded metadata formats

Switch supports the following embedded metadata formats:

Format	Description	Reference
EXIF	A binary format designed to store information about a photograph Generated by all digital cameras and used by many desktop applications and asset management systems	Exif Version 2.2 specification dated April 2002 (JEITA CP-3451)
IPTC	A binary format designed to store news-related information in photographs Used by many applications including asset management systems	IPTC – NAA Information Interchange Model Version 4 dated July 1999

Format	Description	Reference
		IPTC Core Schema for XMP Version 1.0 Revision 8 dated March 2005
XMP	An XML-based format defined by Adobe Embedded in images or compound documents; used by Adobe Creative Suite and many other applications	Adobe XMP specification dated September 2005

Also see "Supported file formats" below.

Read-only access through variables

Switch allows the use of variables in the values of many text properties and for defining file filters. Variables provide access to run-time information about a job including embedded metadata fields.

Examples of embedded metadata fields that can be accessed through variables include:

Group	Type of information	Metadata format
Doc	Title, keywords, author(s), copyright terms	XMP
IPTC	Contact, location, headline, instructions	IPTC
Image	Resolution, orientation, color mode	EXIF (TIFF tags)
Photo	Exposure time, aperture, focus, flash	EXIF (EXIF tags)

Read-write access through scripting

Enfocus Switch offers complete access to embedded metadata through the scripting API:

- The Job.getEmbeddedDataset() function retrieves a dataset object representing the job's embedded metadata.
- The XMP data model query functions allow reading fields in the embedded dataset.
- The XMP data model update functions allow writing or updating fields in the embedded dataset for certain supported file formats.

Rather than providing separate data models for each embedded metadata format, Switch synchronizes the binary EXIF and IPTC tags with the XMP properties – offering a unified view of all metadata using the XMP data model. See *Supported file formats* on page 426.

Supported file formats

The following table lists the embedded metadata capabilities for the supported file formats.

File format	Metadata access	XMP packet handling	EXIF & IPTC synchr.	Image data synchr.
JPEG, TIFF	Read and write (*)	Smart read and write (*)	For reading and writing (*)	For reading
Photoshop	Read and write (*)	Smart read and write (*)	For reading and writing (*)	None
PNG	Read and write (*)	Smart read and write (*)	None	For reading
PDF	Read and write (*)	Smart read and write (*)	None	None
InDesign, PostScript	Read-only	Smart read-only	None	None
Other formats	Read-only	Generic read-only	None	None

(*) Write access is available only through scripting

XMP packet handling

There are two distinct methods to locate XMP packets embedded in a file:

- Scan the complete file for the magic markers at the head and tail of a packet: this works for any file format, but may possibly locate the wrong packet in case a composite document contains multiple packets.
- Interpret the file format's structure to track down the packet: this guarantees that the correct packet has been located and it is usually much faster, but it requires a specific algorithm for each distinct file format.

As indicated in the table, Switch offers three levels of support for embedded XMP packets depending on the file format:

- Smart read and write: interprets the file format to allow reading, updating and inserting an XMP packet.
- Smart read-only: interprets the file format to locate the appropriate document-level XMP packet but does not allow changes.
- Generic read-only: uses generic packet scanning to locate one of the XMP packets in the document; does not allow changes.

EXIF and IPTC synchronization

As indicated in the table, for some file formats Switch performs two-way synchronization between binary EXIF and IPTC tags on the one hand and XMP properties on the other hand, similar to the behavior of the Adobe Creative Suite applications.

For supported file formats, when creating the embedded dataset for a job, Switch performs these steps:

- Locate the primary embedded XMP packet and parse it into an XMP object model; if there is no XMP packet start with an empty XMP object model.

- Read the appropriate binary EXIF and IPTC tags, if present and merge their values into the XMP object model as the equivalent XMP properties.
- Offer access to the resulting unified XMP object model.

For supported file formats, when saving changes for a writable embedded dataset, Switch performs these steps:

- If any changes were made to the dataset as compared to the original XMP packet, save the complete unified XMP information in an updated or inserted XMP packet.
- If changes were made to one or more synchronized properties that are "user-editable", update or insert the corresponding binary EXIF or IPTC tags. Properties that reflect characteristics of the image (and thus should never be edited by a user) are not updated in the binary tags.

Image data synchronization

As indicated in the table, for some file formats Switch retrieves basic information about the image from the image data itself and writes this information to the appropriate fields in the XMP packet. This ensures that the following fields are always present for these formats:

Variable name	XMP location path
Image.ColorMode	photoshop:ColorMode
Image.ICCProfile	photoshop:ICCProfile
Image.SamplesPerPixel	tiff:SamplesPerPixel
Photo.ColorSpace	exif:ColorSpace
Photo.PixelXDimension	exif:PixelXDimension
Photo.PixelYDimension	exif:PixelYDimension

Locating the backing file

The backing file for an embedded dataset is determined as follows:

- If the job is an individual file, use it as the backing file.
- Otherwise if the job folder immediately contains a single Adobe InDesign file (that is, at the uppermost level), use that InDesign file as the backing file.
- Otherwise use the job folder path for the backing file and return an empty read-only dataset.

External metadata

Switch offers substantial support for importing, exporting, transforming and using metadata through a combination of:

- Standard tools for picking up and exporting metadata associated with a job.
- Complete access to metadata from the Switch scripting environment.

For example, using simple script expressions you can route a job and set its processing parameters based on metadata provided with the job.

Also see metadata overview.

Picking up metadata

Switch allows permanently associating metadata with a job moving through the flow (by storing a reference to it in the job's internal job ticket). Each distinct set of metadata fields (for example, a JDF job ticket or an XMP packet) are stored in a separate metadata dataset. Switch supports several types of datasets, each with a specific data model that determines the semantics for querying values from the dataset. See below for information on supported data models.

Metadata can originate from a number of different sources including a job ticket provided with a job, an XMP packet embedded in a file, statistics derived from a file's contents and manual data entry through the Switch Web Portal. Certain flow elements, including several built-in metadata pickup tools, can associate a new metadata dataset with a job being processed through the tool. Each dataset is given a unique name. Therefore, multiple datasets of the same type can be associated with a job (for example: two JDF job tickets, each in its own dataset with a distinct name).

To pickup metadata from a particular source, a flow designer must explicitly place the appropriate pickup tool or configurator in the flow, at a location before the metadata is actually queried. See below for a list of typical metadata sources and the corresponding Switch tools.

Using metadata

The Switch scripting API provides access to the contents of all metadata datasets already associated with a job and offers the appropriate functions for querying metadata values in each dataset, depending on its data model. Furthermore, the scripting API allows adding a new dataset or replacing an existing one.

Using script expressions, a flow can route a job and set its processing parameters based on the contents of metadata fields associated with the job. Script elements offer complete freedom for importing, exporting, transforming and using metadata at will.

Variables in the Metadata group provide access to any external metadata field associated with a job. Switch allows the use of variables in the values of many text properties and for defining file filters.

Updating metadata

The datasets picked up in the manner described above are called external datasets, as opposed to the embedded dataset which references information stored inside the file - see embedded metadata.

Switch does not support updating the value of individual metadata fields within an external dataset. This limitation does not apply to an embedded dataset (see *Read-write access through scripting* on page 426) or to hierarchy info and email info (which is stored directly in the internal job ticket and not in a metadata dataset).

Note that, despite this limitation, it is possible to replace an external dataset as a whole by a new version.

Exporting and transforming metadata

Any metadata dataset associated with a job can be exported as a separate file (in the same format) using the export metadata tool. The result can be further transformed to an appropriate XML, HTML or text file using the XSLT transform tool.

Metadata data models

Switch supports the following metadata data models and corresponding querying mechanisms:

Data model	Description	Query mechanism	Scripting API
XML	Any well-formed XML file (with or without XML namespaces); refer to the XML 1.0 specification	XPath 1.0 expression and/or location path	Dataset class, XML data model
JDF	A JDF file conforming to the JDF 1.3 specification	XPath 1.0 location path	Dataset class, JDF data model
XMP	An Adobe XMP packet or file conforming to the Adobe XMP specification dated September 2005	Adobe XMP location path (subset of XPath)	Dataset class, XMP data model
Opaque	An arbitrary data file (allows associating information such as a human readable report with a job)	None	Dataset class, Opaque data model

Metadata resources

The following table lists various metadata sources and the corresponding metadata data models. The default dataset name can be overridden in most cases to allow associating more than one dataset of the same type with a job.

Source	Pickup tool	Data model	Default dataset name
Email message components	Mail receive	XML	Email
Manual entry in the Switch Web Portal	Fields defined in Submit point or Checkpoint	XML	Submit or Check
Separate XML file	XML pickup	XML	Xml
Separate JDF file	JDF pickup	JDF	Jdf
Separate XMP file	XMP pickup	XMP	Xmp
Embedded XMP packet	XMP pickup	XMP	Xmp
Any data file	Opaque pickup	Opaque	Opaque
Adobe Acrobat JDF	Uncompress MIME file; then JDF pickup	JDF	Jdf

Source	Pickup tool	Data model	Default dataset name
QuarkXPress Job Jacket	JDF pickup	JDF	Jdf
PDF contents statistics	Apago PDFspy configurator	XML	Pdf
Preflight results	callas pdfInspektor or Enfocus PitStop Server or Markzware FlightCheck Professional configurator (with XML report); then XML pickup	XML	Xml
Text log or PDF preflight report	Any configurator with outgoing traffic light connections (set the "carry this type of files" property to "data with log")	Opaque	Log

Pickup modes

The metadata pickup tools (XML pickup, JDF pickup, XMP pickup) allow associating metadata from various sources as a metadata dataset with a job's internal job ticket. The tools support several distinct mechanisms to locate the metadata source and its corresponding asset, as described in the following subsections.

Terminology

- Metadata source: the file (or sometimes the portion of a file) that contains the metadata to be picked up.
- Asset: the file or job folder that is being described by the metadata and that will be moved along in the flow after its internal job ticket has picked up the metadata.
- Pickup mode: a particular mechanism/algorithm to locate the metadata source and its corresponding asset.

Metadata alongside asset

The metadata source (which is always a single file) and the corresponding asset (which may be a file or a job folder) are both placed in one of the pickup tool's input folders (the same folder or a different one) at the top level (that is, immediately under the input folder). Both have the same name but a different filename extension. The supported filename extensions are defined through flow element properties for the pickup tool.

The pickup tool waits until both the asset and the metadata source have arrived and then performs the following steps:

- Create a new metadata dataset with a copy of the metadata source as its backing file.
- Associate this dataset with the asset's internal job ticket under the dataset name specified through a flow element property for the pickup tool (replacing any existing association with the same name).
- Remove the metadata source.
- Move the asset to the output folder.

Property	Description
Metadata filename pattern	One or more file types or filename extensions that are recognized as metadata files
Orphan timeout (minutes)	The time delay after which an incoming metadata source or an incoming asset is considered orphaned because it can't be matched to a counterpart Orphaned jobs are moved to the problem jobs folder

Metadata in job folder asset

The asset (which is always a job folder) is placed in one of the pickup tool's input folders and the metadata source (which is always a single file) resides inside the job folder. The pickup tool provides flow element properties for locating the metadata source within the job folder (nesting level and filename pattern).

The pickup tool waits until the job folder has fully arrived and then performs the following steps:

Locate the metadata source; if none is found the next two steps are skipped.

- Create a new metadata dataset with a copy of the metadata source as its backing file.
- Associate this dataset with the asset's internal job ticket under the dataset name specified through a flow element property for the pickup tool (replacing any existing association with the same name).
- Move the job folder asset to the output folder.

Note that the metadata source is not removed in this case.

Property	Description
Metadata file filters	File filter that determines which of the files in the job folder represents the metadata; files are scanned starting at the topmost nesting level (at each level the scan order is arbitrary); the file filter is evaluated in the context of each file and the first file that matches is used as metadata source
Search depth	The number of nesting levels in which to look for the metadata; "1" means the topmost level only

Metadata refers to asset

The metadata source (which is always a single file) is placed in one of the pickup tool's input folders and it contains a reference to the asset (which may be a file or a job folder) in some other location accessible through the file system. Thus the asset itself is never directly placed in a flow input folder.

The pickup tool provides flow element properties for locating the asset reference inside the metadata source (a location path) and for determining whether the original copy of the asset should be removed or not.

When the pickup tool detects an incoming file, it expects it to be a metadata source and it performs the following steps:

- Locate the asset reference in the metadata source, locate the asset, and ensure that it is readable. If any of these steps fail, report an error and quit.

- Create a new metadata dataset with a copy of the metadata source as its backing file.
- Associate this dataset with the asset's internal job ticket (which in fact is the metadata source's job ticket) under the dataset name specified through a flow element property for the pickup tool (replacing any existing association with the same name).
- Copy or move (depending on the property settings) the asset from its original location to the output folder.
- Remove the metadata source.

Property	Description
Asset path	A script expression or a single line text with variables that evaluates to the file or folder path referring to the asset to be copied (*)
Delete asset	Determines whether the original copy of the asset is deleted after it has been copied into the flow; this can be an explicit value or a script expression (*)

(*) Usually script expressions are evaluated in the context of an incoming job before the tool acts on the job. As an exception to this rule, here the script expressions are evaluated AFTER the incoming metadata has been picked up (but before the asset has been located) so that the script expression can access the metadata to calculate its return value.

Note: Based on the remark above, a flow designer could assume that, at the moment the dynamic values for the 'Asset path' and 'Delete asset' properties are calculated, the incoming job is already converted to a metadata dataset. However, this is only true, when the flow is active (and a job arrives), not at flow design time. This means that, when designing a flow, it is not possible to hold a job (XML or JDF) for the purpose of building an XPath for example, as the incoming job has not yet been converted to a dataset. As a workaround, the designer can create an additional test flow that attaches the job as dataset to itself. This test flow can be used for building, for example, XPath expressions that afterwards can be copied to the element property in the main flow.

Metadata embedded in asset

The asset (which is always a single file) is placed in one of the pickup tool's input folders and the metadata source is embedded in the asset file according to some format (which depends on the pickup tool).

When the pickup tool detects an incoming file, it expects is to be an asset and it performs the following steps:

- Extract the metadata source from the asset and store it into a standalone file; if the asset does not contain embedded metadata of the appropriate type, the next two steps are skipped.
- Create a new metadata dataset with this standalone file as its backing file.
- Associate this dataset with the asset's internal job ticket under the dataset name specified through a flow element property for the pickup tool (replacing any existing association with the same name).
- Move the asset file to the output folder.

Property	Description
Synchronize EXIF/ IPTC fields	If set to "Yes", for supported file formats the values of binary EXIF and IPTC tags are merged with the embedded XMP packet before it is picked up (the packet embedded in the asset remains unchanged)

Property	Description
	If set to "No", the embedded XMP packet is picked up without change - if present

Metadata is asset

The pickup tool with a fourth pickup mode: "Metadata is asset" is used to implement for JDF, XML and XMP pickup.

When a job (example: JDF) file is sent to a pickup tool using this feature, the resulting file is the JDF file with its own content as JDF metadataset. So tools have only three properties: Name, Dataset name and Pickupmode. There is no need for additional properties when this pickup mode is selected.

Email message schema

The mail receive tool automatically picks up the contents of incoming email messages as metadata. Specifically, for each incoming message the mail receive tool creates a metadata dataset that contains the relevant components of the message, such as the sender, to, cc, and reply-to addresses and the complete email body text. This dataset is then associated with the job ticket for all files delivered by the message under the standard dataset name "Email".

Data model and schema

The email message dataset uses the XML data model with a simple schema without namespaces.

The XML document element name is "email". It contains an element for each message component as described in the table below; each element contains the text of the corresponding message component. If a message component is not present or it contains only white space, the corresponding element is missing.

Leading and trailing white space is removed (except for the body text, where it may be significant). Otherwise, no parsing or reformatting is performed. For example, a list of email addresses (including its separators) is stored exactly as it was provided in the incoming message.

Element name	Message component
message-id	An identifier for the message (assigned by the host which generated the message)
subject	The subject line of the message
date	The date and time when the message was sent (formatted as it appeared in the message header)
from	The email address(es) of the author(s) of the message
sender	The single email address of the sender of the message; if there is a single author the sender is identical to the author, otherwise the sender should be one of the authors

Element name	Message component
reply-to	The email addresses to which a response to this message should be sent
to	The email addresses of the primary recipients of this message
cc	The email addresses of the secondary recipients of this message
body	A plain-text rendition (without markup) of the body text of this message

Processing results schema

The FTP send and Mail send tools produce a log file with processing results. This log file is carried along the outgoing log connections.

This log file can be associated with the job as a metadata dataset by using a "data with log" connection (see the "Carry this type of files" property of traffic-light connections).

Data model and schema

The processing results log file uses the XML data model with a simple schema without namespaces.

The XML document element name is "ProcessingResults". It contains a sequence of elements with a name and contents as described in the following table. If a data item is not applicable, the corresponding element may be missing.

Element name	Data type	Description
Destination	Text	For FTP, the complete target URL for the job For Mail, the list of destination email addresses
FlowElementName	Text	The name of the flow element that produced this log file (as displayed in the canvas)
FlowElementType	Text	The type of the flow element that produced this log file (e.g. "FTP send" or "Mail send")
FlowName	Text	The name of the flow (as displayed in the flows pane) containing the flow element that produced this log file
JobArrivalStamp	Integer	The arrival stamp for the processed job as a signed integer number; a lower arrival stamp indicates a job that arrived in the flow earlier (and vice versa) Several jobs may have the same arrival stamp, for example when multiple jobs are generated from the same original job

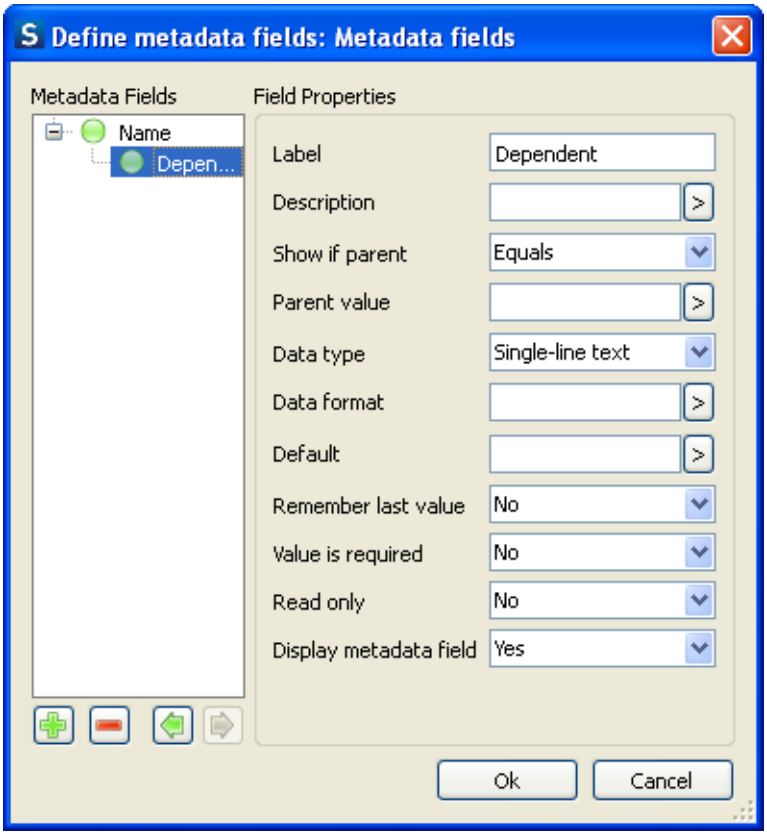
Element name	Data type	Description
JobByteCount	Integer	The size in bytes of the processed job; if it is a job folder, all files in subfolders are included in the count, recursively
JobExtension	Text	The processed job's filename extension, or the empty string if there is none
JobFileCount	Integer	The number of files in the processed job, including all files in subfolders, recursively (folders and subfolders themselves do not contribute to the count)
JobFiles	Sequence of "File" elements	A sequence of one or more "File" elements representing the files in the processed job in arbitrary order; each File element has the Text data type and contains the relative path of a file within the job (using a forward slash as path separator) Folders are NOT represented in this list
JobIsFile	Boolean	True if the processed job is a single file, false otherwise
JobIsFolder	Boolean	True if the processed job is a folder, false otherwise
JobName	Text	The file or folder name for the processed job, including filename extension if present, but excluding the unique filename prefix
JobNameProper	Text	The file or folder name for the processed job excluding filename extension and excluding the unique filename prefix
JobOrigin	Text	An indication of the origin of the processed job before it was injected in the flow; for example, a Submit point writes the absolute path of the original job (on the client computer) in this field
JobPath	Text	The absolute file or folder path for the processed job as it resided in the input folder before being processed, including unique filename prefix
JobPriority	Integer	The job priority assigned to the processed job as a signed integer number
JobUniqueName Prefix	Text	The unique filename prefix used for the processed job, without the underscores; for a job called "_0G63D_myjob.txt" this would be "0G63D"

Element name	Data type	Description
JobUserName	Text	The user name associated with the processed job, if any
ProcessingEnded	Date	The date-time when the operation was completed (in the ISO 8601 format also used for Switch date variables)
ProcessingStarted	Date	The date-time when the operation started (in the ISO 8601 format also used for Switch date variables)
ServerAddress	Text	The name or IP address of the destination server
ServerLoginName	Text	The user name used to login at the destination server
ServerPort	Integer	The port of the destination server

Defining metadata fields

The Submit point and the Checkpoint tools allow defining metadata fields which can be viewed and/or edited by the Switch Web Portal user when submitting or routing a job. The values of display-only fields are determined by evaluating a script expression so that they can depend on metadata associated with the job. After a user submits a job or moves it along, the values of editable fields (as entered by the user) are associated with the job as metadata (with the client fields schema).

Defining metadata fields



The property editor for editable metadata fields allows creating an ordered list of field definitions (using the buttons under the listbox on the left-hand side). For each field definition, the property editor allows editing the properties described in the table below (using the edit fields and controls on the right-hand side).

Property	Description
Label	The label shown in front of the field.
Description	Description for this field shown as tool tip when user hovers over the label or the data field in the Switch Web Portal.
Show if parent	In the dropdown menu, choose the condition for comparing parent value and dependent value. Options available are: • Equals • Not equals • Contains • Does not contain • Starts with • Does not start with • Matches • Does not match
Parent value	*The value (string) of the parent field on which this child field depends. Dependency is set using the arrow keys in the field list.*

Property	Description
	If you choose the "Matches" option for "Show if Parent" property then regular expression will be used for all parent values.
Data type	The field's data type: Dropdown list (Single-line text, Password, Date, Number, Hours and minutes, No-yes list, Dropdown list).
Data format	Only available when "Data type" is set to single-line text or number. Format the metadata field using a regular expression. Leave empty to not set any special formatting (Single-line text, Regular expression).
Data values	Only available when "Data type" is set to "Dropdown list". Define the drop down list (Edit multi-line text, Define multi-line text with variables, Define script expression, Define values from dataset, Define values from ODBC data source).
Default	The default value for the field (Single-line text, Single-line text with variable, Condition with variables, Date and Script expression). ***Using variables:*** It is possible to use variables to define the default value for your metadata field (Single-line text with *variables*, Condition with *variables*). However, most variables (e.g. doc author, page height, number of pages, ...) are not suited, as the requested information is only available *after* the job has been submitted to the Switch Server. At the time of submitting the job, only the variables of the Switch variables group (e.g. date, flow name, server name, ...) are available and can be displayed to the user. Some examples: • [Job.Size] as default value is invalid; this will result in see "0 bytes" as the job size is unknown as long as the job hasn't been submitted to the Switch Server. • [Switch.Date:TimeZone="UTC"] is valid and will show the current date and time (= the date/time you're using the Switch Web Portal to submit the file). ***Mismatches:*** In case "Data type" is Dropdown list with dynamically generated content, this default value might not correspond with one of the list items. In this case the "Default value" is empty in the Switch Web Portal. In case the "Data type" format and the default values format do not match, Switch tries to force the formatting of the data type property (example, Data type is hour and minute and the Default value is a text variable). If forcing is not possible, the Default value is empty in the Switch Web Portal.
Remember last value	If set to "Yes", the most-recently value entered by the user (in this field) is displayed. In case "Data type" is Dropdown list with dynamically generated content, the previous value might become irrelevant. The previous

Property	Description
	value is however stored so we can also compare it with the content of the list. If the stored value matches one of the data values, then this value is shown. If the stored value no longer appears in the list, no value is shown.
Value is required	If set to "Yes", the user must enter a non-blank value (relevant only if Data type is string).
Read only	Set this to "Yes" to make this field read only.
Display metadata field	If set to "Yes" this field is displayed and when set to "No" it is hidden. See *Using metadata* on page 429 and *Defining metadata fields* on page 437 for more information.

Note: For the **Checkpoint** tool, when a user selects "Define values from dataset" in the **Data Values** field, the **Build location path** window appears using which XPath expressions can be created. The regular variables from a dataset returns only one single value where as the result of the XPath can be a list of values.

Note: For the **Submit point** and the **Checkpoint** tools, when a user selects the "Define values from ODBC data source", **Build SQL statement** window appears. The regular variables from database returns only one single record where as the result of the SQL statement can be a list of records.

Note: Switch.OutgoingName cannot be used to define metadata fields in Checkpoints and Submit points.

Update metadata

Click the button present below the **Metadata fields** list to access a dialog box which displays a two level tree: first level table tree of all Submit points (level 1) and second level for their metadata fields (level 2).

In the list, a Submit point can be checked (including all its fields) or an individual field can be selected. The fields that are checked are added to the **Metadata fields** list. Possible dependencies are preserved.

The fields from a Submit point are clearly marked (using color or some other mark). Therefore, user can distinguish such fields from a newly added Checkpoint field. All properties from these fields are grayed-out, except the **Show if parent equals ...** property, the **Read only** property and the **Display metadata field** property.

Behavior of updated fields in the Switch Web Portal

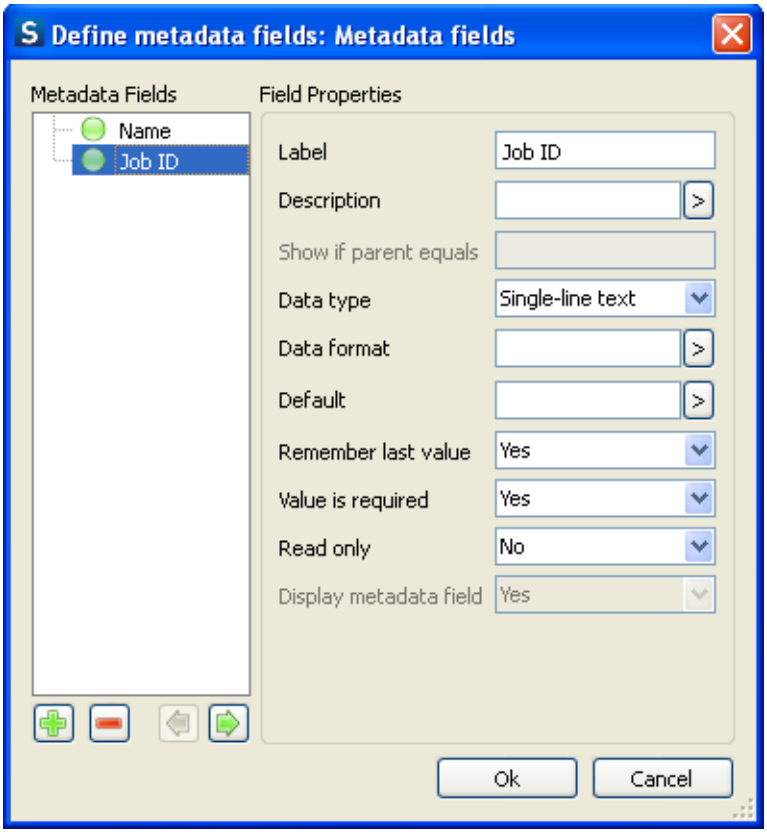
The **metadata** from the **submit dataset** is shown as the **default value**.

On the Switch Web Portal, users can read and change this data (if allowed). The new value is written to the **check dataset**. So technically, this is not a real update from the data but a copy from a field of one dataset (submit) to another (check). The Switch user can of course use the same name for the submit and check dataset. In this case the first dataset is overwritten.

If metadata fields are changed or added on a Submit point, the user will probably wish to update those fields in the Checkpoint too. Switch however does not offer an automatic update mechanism, so the user has to delete the field and re-import it again.

If users delete a field from a Submit point, they are also responsible for deleting that field from the Checkpoint metadata list as well. If a user does not remove the deleted field from the Checkpoint metadata list, then the field is still shown but the default value will then be empty.

Defining display-only fields



The property editor for display-only metadata fields allows creating an ordered list of field definitions (using the buttons under the listbox on the left-hand side). For each field definition, the property editor allows editing the properties described in the table below (using the edit fields and controls on the right-hand side).

Property	Description
Label	The label shown in front of the field
Description	A hint displayed when the cursor hovers over the field
Data type	The field's data type: Boolean or string
Calculated value	A script expression that evaluates to the value of the metadata field; it is evaluated in the context of the job being viewed by the user so that it can use metadata associated with the job

Client fields schema

The Submit point and Checkpoint tools pickup metadata fields entered by the user when submitting or routing a job through the Switch Web Portal.

Specifically, when a user submits a job and the list of field definitions in the Submit point's "Metadata fields" property is not empty, the Submit point:

- Creates a metadata dataset containing the contents of the metadata fields entered by the user.
- Associates this dataset with the job ticket for the submitted job under the dataset name specified in the "Dataset name" property.

Similarly, when a user routes a job residing in a Checkpoint and the list of editable field definitions in the Checkpoint's "Metadata fields" property is nonempty, the Checkpoint creates a metadata dataset and associates it with the job's job ticket under the specified dataset name.

Note that a Checkpoint always creates a completely new dataset, i.e. it does not update or modify an existing dataset (even if the job was previously moved through the same or another Checkpoint). If the job already has dataset association with the same name, the reference to the old dataset is removed and replaced by the new one.

Data model and schema

The client fields dataset uses the XML data model with a simple schema without namespaces.

The XML document element name is "field-list". It contains a "field" element for each item in the list of editable metadata field definitions associated with the Submit point or Checkpoint under consideration. The "field" elements occur in the same order as in the list of field definitions, and a "field" element is present even if the corresponding field's value is empty.

Each "field" element in turn contains zero or one occurrence of each element listed in the table below. Within the contents of those child elements leading and trailing white space is removed.

Element name	Description of element contents	Element is present
tag	The field name; in the current implementation this is equal to the human-readable field label	Always
type	The field's data type; that is, "boolean", "string" or "choice"	Always
format	A regular expression that matches the values allowed for the field (relevant only if data type is string)	If type is string and if regexp is not blank
required	Equals "true" if the user is required to enter a non-blank value, "false" otherwise (relevant only if data type is string)	If type is string
value	The value for the field: • For boolean data types: "true" or "false" • For string data types: the value entered by the user after removing any leading and	Always

Element name	Description of element contents	Element is present
	trailing white space (may be the empty string unless required is set to true)	
items	The field's possible choices	if type is choice

Introduction to XPath 1.0

XPath 1.0 is used in the Switch scripting API for querying the contents of XML documents in the XML and JDF data models and in the XML module.

Note: The current version of Switch does not support XPath 2.0.

Refer to the XPath 1.0 specification, the XML 1.0 specification, the XML namespaces specification, and widely available literature for full details on XPath 1.0.

The remainder of this topic provides a brief introduction to a very small subset of XPath 1.0.

Expressions and location paths

XPath models an XML document as a tree of nodes. There are different types of nodes, including element nodes, attribute nodes and text nodes. XPath defines a way to address specific nodes in the node tree, to compute a string-value for each type of node and to perform more general calculations with these values.

The primary construct in XPath is the expression. An expression is evaluated to yield an object, which has one of the following four basic types:

- node-set (an unordered collection of nodes without duplicates).
- boolean (true or false).
- number (a floating-point number).
- string (a sequence of Unicode characters).

One important kind of expression is a location path. A location path selects a set of nodes. The result of evaluating an expression that is a location path is the node-set containing the nodes selected by the location path. Location paths can recursively contain expressions that are used to filter sets of nodes.

Location paths

A location path is a sequence of one or more location steps separated by a slash. Each location step in turn (from left to right) selects a set of nodes relative to the context node determined by the previous step. The initial context node is determined by the location path's context (for the data model queries in Switch this is always the document's root node; in the XML module it is the node being queried). A slash in front of a location path makes the location path absolute, that is, the "/" refers to the root node of the document.

Here are some examples of location paths:

para

selects the para element children of the context node

*

selects all element children of the context node

text()

selects all text node children of the context node

@name

selects the name attribute of the context node

@*

selects all the attributes of the context node

para[1]

selects the first para child of the context node

para[last()]

selects the last para child of the context node

*/para

selects all para grandchildren of the context node

/doc/chapter[5]/section[2]

selects the second section element in the fifth chapter element in the doc document element

chapter//para

selects the para element descendants of the chapter element children of the context node

//para

selects all the para descendants of the document root and thus selects all para elements in the same document as the context node

//olist/item

selects all the item elements in the same document as the context node that have an olist parent

.

selects the context node

.//para

selects the para element descendants of the context node

..

selects the parent of the context node

../@lang

selects the lang attribute of the parent of the context node

para[@type="warning"]

selects all para child elements of the context node that have a type attribute with value warning

para[@type="warning"][5]

selects the fifth para child element of the context node that has a type attribute with value warning

para[5][@type="warning"]

selects the fifth para child element of the context node if that child has a type attribute with value warning

chapter[title="Introduction"]

selects the chapter child elements of the context node that have one or more title child elements with string-value equal to Introduction

//field[name="JobID"]/value

selects all value elements in the document that have a parent field element and a sibling name element with string-value equal to JobID

chapter[title]

selects the chapter child elements of the context node that have one or more title child elements

employee[@secretary and @assistant]

selects all the employee child elements of the context node that have both a secretary attribute and an assistant attribute

Expressions

The location paths listed in the previous section contain a few examples of simple expressions used to filter nodes (such as @type="warning" to filter out elements with a particular attribute value). Expressions can also stand on their own, and can be used to express calculations based on the result of a location path. XPath provides a limited number of functions for use in expressions.

Here are some examples of expressions:

para

evaluates to the text contents of the para element(s)

@type

evaluates to the text contents of the type attribute

(2 + 3) * 4

evaluates to the number 20

number(@type) > 10

evaluates to true if the contents of the type attribute represents a number that is greater than 10; and to false otherwise

count(//field)

evaluates to the number of field elements in the document, regardless of their position in the node tree

count(/doc/chapter[5]/section)

evaluates to the number of section elements in the fifth chapter element in the doc document element

string-length(normalize-space(para))

evaluates to the number of characters in the text contents of the para element, after removing leading and trailing white space and replacing sequences of white space characters by a single space

Namespaces

The examples above assume that the XML document being queried does not use namespaces. In practice however many XML documents do use namespaces to avoid conflicting element and attribute names when information of a different type or origin is mixed.

A namespace is identified by a Unique Resource Identifier (URI) which resembles a web page address but in fact is just a unique string (most URIs do not point to an actual web page). Rather than repeating this URI each time, element and attribute names use a namespace prefix (a shorthand) to refer to a namespace. The mapping between namespace prefixes and namespace URIs is defined in namespace declarations in the XML file.

For example:

xml:lang

is the name of a standard xml attribute for indicating a natural language

jdf:node

is the name of a node element in the JDF specification, assuming that the jdf prefix is mapped to the JDF namespace URI

Namespaces and XPath

If the XML file being queried uses namespaces, the XPath expressions and location paths must use namespace prefixes as well. The mapping between those prefixes and the corresponding namespace URIs must be passed to the query function separately, since this information can't be expressed in XPath.

Note that namespace URIs must match between the XPath expression and the XML file; the namespace prefixes may differ.

XPath does not have the concept of a default namespace. If the XML file being queried defines a default namespace, the XPath expression must specify a namespace prefix to refer to elements in that namespace. The default_switch_ns prefix can be used to specify elements using the default namespace.

Introduction to Adobe XMP location paths

The Adobe XMP specification dated September 2005 defines the XMP data model (the abstract node hierarchy represented by an XMP packet or file). Other Adobe publications define a mechanism to address a specific node in the XMP data model, using a syntax that is a (very small) subset of the XPath 1.0 location path syntax. In this documentation we refer to this mechanism as XMP location paths.

XMP location path syntax

An XMP location path points to a specific node in an XMP node hierarchy (whether the node exists or not).

An XMP location path is a series of one or more XMP location steps separated by a slash. Each location step address the next child element, depending on the structure of the document.

Each location step is one of the following:

- A prefixed field name
- An array index selector
- A language selector

A language selector may occur only as the very last location step. The first location step is always a prefixed field name.

Field name

A field name addresses a named element (also called a field).

For example:

xmp:SomeProperty

Addresses a field named "SomeProperty" in the namespace to which the "xmp" namespace prefix is mapped.

Index selector

An index selector addresses an item in an array. Indices are one-based, that is, the first item in an array has index 1. The last item in an array can be addressed with the special index "last()". In all cases the index must be enclosed in square brackets and preceded by an asterisk.

For example:

*[1]

*[4]

*[last()]

Address the first, the fourth and the last item of an array, respectively.

Language selector

A language selector addresses an item in a collection with language alternatives (a collection of strings with the same meaning but localized for different human languages). The language is indicated by a 2-letter language code (ISO 639), optionally followed by a 2-letter country code (ISO 3166). The special language code "x-default" indicates the default language. The language code must be embedded in special XPath syntax for addressing the xml:lang attribute.

For example:

*[@xml:lang='enUS'] *[@xml:lang='x-default']

Address U.S. English and the default language item, respectively.

Examples

The following examples address properties in the XMP Dublin Core schema, which is usually associated with the "dc" prefix. Thus these examples assume that the "dc" prefix is mapped to the Dublin Core namespace URI (http://purl.org/dc/elements/1.1/).

Examples:

dc:format

Addresses the top-level data format property.

dc:creator/*[1]

Addresses the first item in the list of document creators, which by convention is the primary author of the document.

dc:description/*[@xml:lang='x-default']

Addresses the default item in the list of language alternatives for the document's description.

5.5.4. Scripting Module

If you have an active license for the Scripting Module, you have access to the **Script element** in the Flow elements pane. This allows you develop your own scripts (using the SwitchScripter application, which comes with Switch), for example to extend the capabilities of Switch. You can also create your own configurator(s) using SwitchScripter, for interaction with third-party applications that are not yet supported by Switch.

Note: If you want to create your own configurators, in addition, you need a Configurator SDK key. Such a key adds extra functionality to SwitchScripter and allows you to convert your scripts into configurators.

For more information, refer to the *Switch Scripting documentation on the Enfocus website*. There is also a guide with sample scripts available on the Enfocus website.

5.5.5. Database Module

The Database module is an advanced module that allows **read/write access to databases (through ODBC data sources) without the need for extensive scripting**. With the database module, business or job management software can be used in conjunction with Switch workflows to further automate job decisions.

An active Database module license provides you with access to:

- The **ODBC data sources** option in the **User preferences** dialog (required *to set up a database connection and to use database variables)*.
- The ***Database connect*** flow element (available in the Database category of the Flow elements pane). This flow element allows you to configure certain settings in databases without having to script them.
- ***Database variables***. This allows you to use any values from your database in Switch.
- **Database values** when defining metadata for a *Submit point* on page 180 on the Switch Web Portal or a Connector in Connect ALL (see the Connect documentation on the Enfocus website).

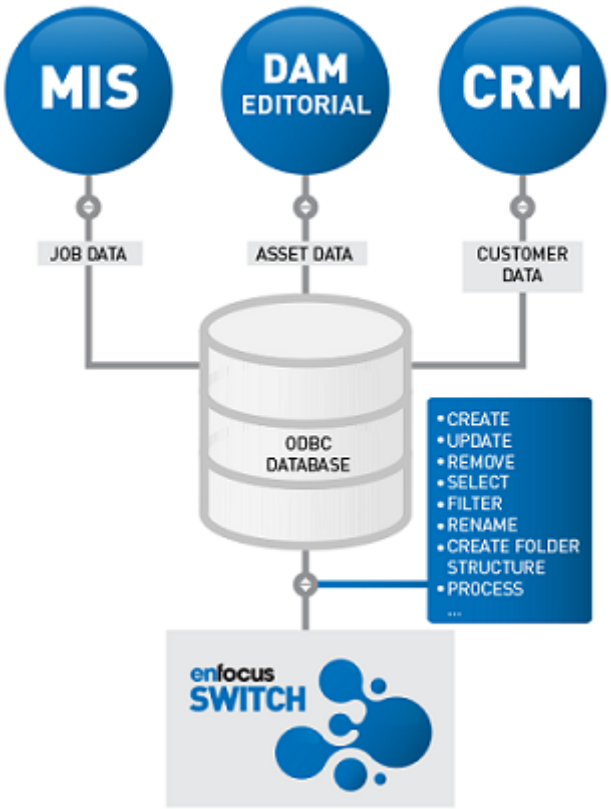
5.5.5.1. Getting started with the Database Module

The Switch Database Module automates the communication between any database and Switch.

This means *you can use database information* in Switch, for example to make decisions based on existing job or customer information. For example, if information about the paper type of a job is available in your MIS system, you can attach this information to the job and use this information to decide whether or not it should go to an Ink Optimizer.

Moreover, you can also *change the information in your database* from within your workflow to store information obtained in the workflow, for example to indicate that the job is done or to store preflight information. You can as well add or delete records in your database.

The illustration below shows how data from different types of databases (MIS/DAM/CRM database) can communicate with Switch through ODBC data sources ("connections to the database").



If you're using *the Switch Web Portal or Connect ALL to submit jobs to Switch*, the Database Module offers an extra feature, i.e. the possibility to present database values to the users and give them the chance to attach the appropriate values to the job. For example, instead of asking the users to type the correct customer ID (risk of typos!), you could show them a list of customer IDs available in the database to choose from.

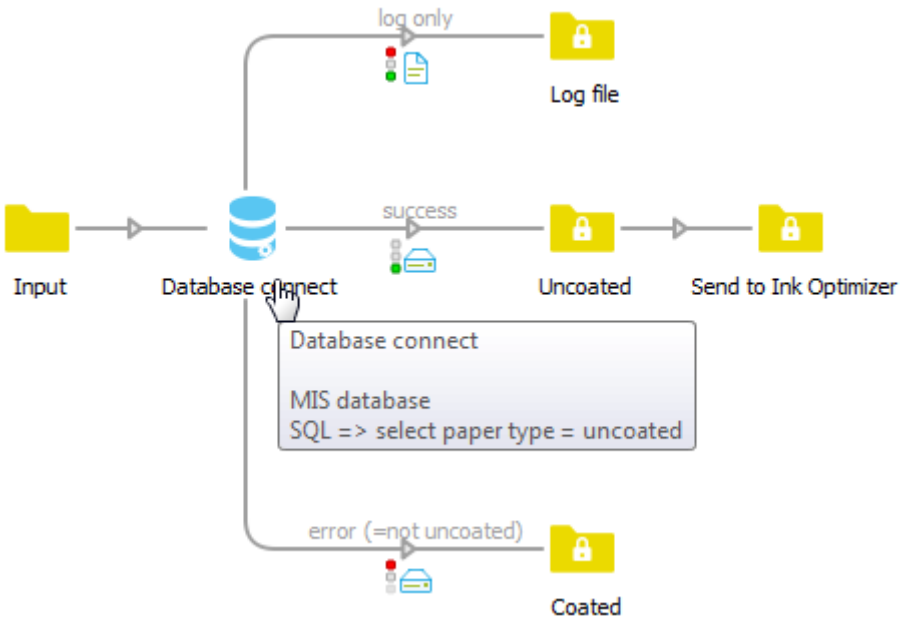
Database connect

An active license for the Database Module gives access to the **Database connect** flow element.

This element allows you to establish a connection with the database of your choice (using ODBC data sources) and to build an SQL statement to determine what data should be collected, added, modified, filtered, changed...

When a job passes through this flow element, the SQL statement is executed. To keep an eye on the changes, you can log the result of the SQL statement.

In the following example, when a job arrives in the Database connect flow element, Switch connects to the MIS database and checks the paper type for the current job. Only if the job matches the SQL statement, the job is "successful" and the job will be sent to the Ink Optimizer. For each job, a log file is created and stored in a separate folder.



Database variables

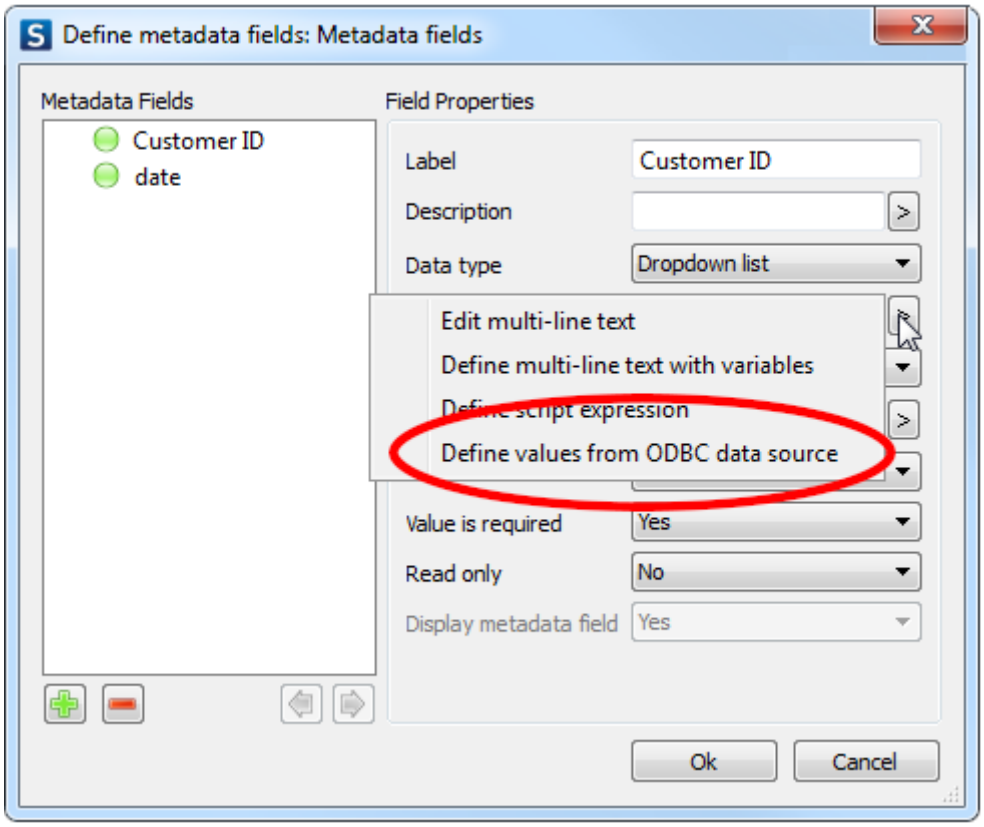
Additionally, the Database Module gives access to an extra set of variables, e.g. the Database variables which also retrieve data from your database but which can be used wherever variables can be used in Switch (so not only in combination with the Database connect flow element).

Variables in Switch are "placeholders" - they are replaced with actual values when a job is being processed. For example, if you want that the customer receives a notification whenever a job is finished, you should use the [Job.EmailAddress] variable (in the Mail send element) to make sure that the email is sent to the right email address (i.e. the address associated with the job). However, if you have activated the Database Module, you can select (additional) email addresses available in your database. The variable will start with "Database", e.g. [Database.Text:SQL=" SELECT Email FROM Customers"] (SQL statement to select records from the column "Email" in the table "Customers").

Database fields in the Switch Web Portal and Connect ALL

A Submit point (in Switch) or a Connector (created with Connect ALL) can be configured to ask for metadata when a job is submitted. Metadata is additional information about the job, sent along with the processed job in the background as an XML, TXT or CSV file (called Job Ticket). It is often used to store administrative information associated with the job or to exchange such information between systems.

If you have licensed the Database Module, you can define your metadata fields using values from your database (again using an SQL statement).



Note: It is only possible to visualize content from the database, for example the possible values for a particular field. It is NOT possible to extract the correct value for a particular job; the operator who submits a job to a Submit point or a Connector has to select it manually.

5.5.5.2. Database Module - Setup

To able to use the features of the Database Module, make sure to:

- *Activate your license for the Database Module*
- *Set up your ODBC database connection*.

About ODBC data sources in Switch

Guidelines

Please take into account the following guidelines when accessing ODBC data sources in Switch:

Before you set up the connection to the data source, you should have defined your database (i.e. the Database Source Name (DSN)) in the **DSN settings of your operating system**. Read the documentation of your database to learn how to set up the DSN.

Windows users can find more information on the Microsoft website: *http://msdn.microsoft.com/en-us/library/ms710252%28v=VS.85%29.aspx*

Mac users should install an ODBC Administrator, for example *http://www.odbcmanager.net/*, to be able to set up ODBC connections on Mac.

Note: Switch allows you to use both User and System DSN on Windows and Mac platforms.

Make sure to install a 64-bit ODBC driver.

- **Example Windows OS:** In case of MySQL database, the ODBC driver installer mysql-connector-odbc-5.1.8-winx64.msi is used. When you launch this installer and choose the **Custom** installation, you will see that two drivers are available: 32-bit and 64-bit. Install the 64-bit driver and preferably disable the 32-bit driver, to avoid mix-up of driver versions in the future. This will guarantee that Switch uses the correct driver.

For more information on ODBC drivers and data sources, refer to *http://msdn.microsoft.com/en-us/library/ms710285%28v=VS.85%29.aspx* .

- **Example Mac OS X:** In the MySQL database, two versions of Mac OS X ODBC drivers are available: 32-bit and 64-bit. You must use the 64-bit version (mysql-connector-odbc-5.2.7-osx10.7-x86-64bit.dmg).

Make sure to use the 64-bit version of the ODBC Administrator tool to configure your data sources (DSNs).

On 64-bit Windows computers, two ODBC Administrator tools are available:

- 32-bit version: ..\windows\sysWOW64\odbcad32.exe
- 64-bit version: ..\windows\system32\odbcad32.exe

Use the 64-bit version from \windows\system32\odbcad32.exe to configure your DSNs for Switch.

- If you install only the 64-bit ODBC driver and then launch the 32-bit version of the tool, you will not be able to configure any DSNs, because the 32-bit version of the tool does not show the 64-bit ODBC drivers.
- If you have installed the 32-bit ODBC drivers, then in the 32-bit version of the tool you will see the 32-bit driver and you will be able to configure DSNs for that driver. However, Switch will not work with these DSNs and you will get the error message The specified DSN contains an architecture mismatch between the Driver and Application".

For more information on managing data sources, refer to *http://msdn.microsoft.com/en-us/library/ms712362%28v=VS.85%29.aspx* .

Using the INGRES database in combination with Switch?

You should set the following flag (in the INGRES database):

```
return NULL for SCHEMA columns in ODBC catalog function result sets
```

Otherwise, you will get an error ("invalid table") when setting up SQL statements.

Setting up an ODBC database connection

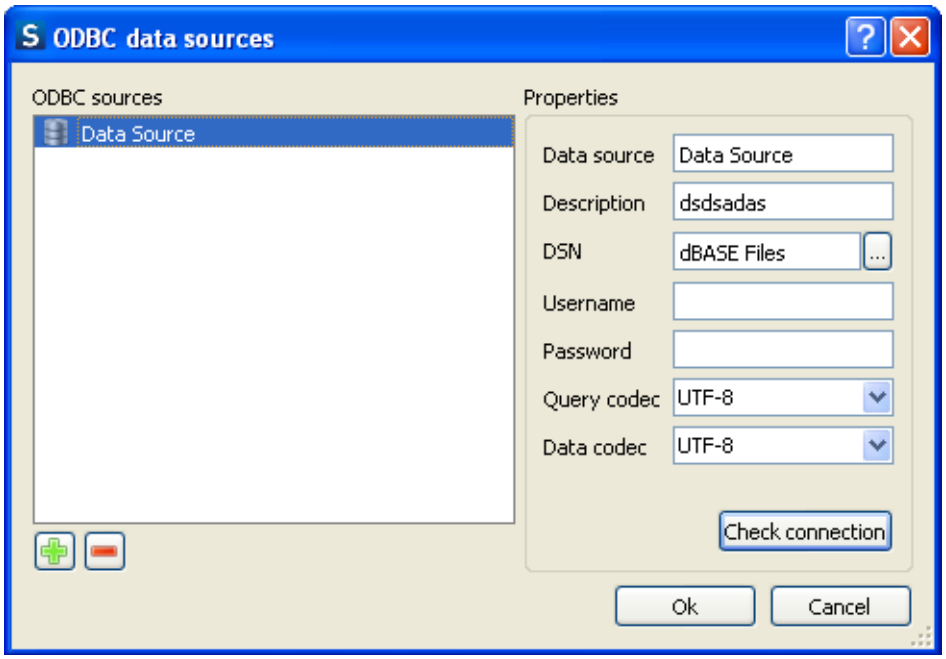
If you want to use Switch with an ODBC data source (and you have licensed the Database module), you must set up a connection to the preferred database.

Note: If you have more than one database, you can configure different database connections as required.

To configure an ODBC database connection

1. In Switch, navigate to **Edit** > **User Preferences** > **ODBC data sources**.
2. Do one of the following:
   - Select the **ODBC data source information** field and click ...
   - Double-click the **ODBC data source information** field.

   The ODBC data sources dialog appears.
3. To add and configure an ODBC data source, click .
   The ODBC sources field now contains one data source, temporarily called *Data Source*. You can rename it in the next step of this procedure.



4. In the **Properties** pane, in the **Data Source** text field, provide a name for the data source.
5. In the **Description** text field, provide a small definition for the data source.
6. To select the DSN (Database Source Name) from the library, click ...
   The DSN must be defined in the DSN settings of your operating system. For more information, refer to *About ODBC data sources in Switch* on page 50.
7. Provide a **Username** and **Password**.
   These two fields can also be left blank if username and password are not required, or if they have already been defined for the DSN.
8. From the drop-down menus, select the appropriate **Query codec** and **Data codec**, if required.
9. To test the database connection, click **Check connection**.

If the connection succeeded, a message box appears displaying the message Connection successful.

Note: In case of problems, you will see an error message generated by the ODBC tool of your operating system.

10. To close the message, click **OK**.

    If you have more than one database, repeat step 3 to 10 and add as many data sources as you have databases.

11. To close the **ODBC data sources** dialog, click **OK** once more.

5.5.5.3. Database connect

This tool helps in configuring certain settings in the databases (like selecting Datasource, adding SQL statement etc) without the use of scripting. It is only available if you have licensed the *Database module*.

Drag and drop the **Database Connect** to the workspace.

Keywords
If you enter one of the following keywords in the Search field at the top of the Flow elements pane, the **Database Connect** element will be shown in the list:

- SQL
- database
- metadata
- xml
- export
- select
- insert
- update
- delete

Connections
Database Connect needs at least one incoming connection.

Property

Property	Description
Name	Provide a name for the flow element. This name is displayed in the workspace.
Description	A description of the flow element displayed in the canvas. This description is also shown in the tooltip that appears when moving your cursor over the flow element

Property	Description
Select data source	Select a data source from the list of predefined data sources. **Note:** If the list is empty, you should first set up a data source. Refer to the **ODBC data sources** option in the **User preferences** dialog (See *Setting up an ODBC database connection* on page 52).
SQL statement	Specify SQL statements using any one of the following three options: • Edit multi-line text • Define multi-line text with variables • Define script expression **Note:** Please pay special attention when using other variables and make sure that the result of the multi-line text is a valid SQL statement.
Log name	Specify the name of the log where the result of the statement should be written by using one of the following three options: • Inline value • Define single-line text with variables • Define script expression
Binary data in opaque dataset	If the result of the SELECT statement returns binary data (for example: video form), select **Yes**. Otherwise, select **No** and configure the subordinate properties.
Log type	*Only available if Binary data in opaque dataset is set to No.* Format of the log (where the result of the statement will be written). Options: • **CSV** • **XML**
Encode binary data	*Only available if Binary data in opaque dataset is set to No.* Defines the way binary data is converted. • **Encode with Base64**: default

Property	Description
	• **Keep as is**: Use this option if the ODBC driver returns binary table fields. This is for example the case when you're using FileMaker in combination with Switch. **Note:** Be careful with this option; it may lead to a corrupted logfile.

At present there is no SQL editor available. Therefore, copying statements generated by the variables, multi line text with variables, database group and build SQL statement dialog box may result in errors.

Note: Refer this site for an *SQL Tutorial*.

5.5.5.4. Database variables

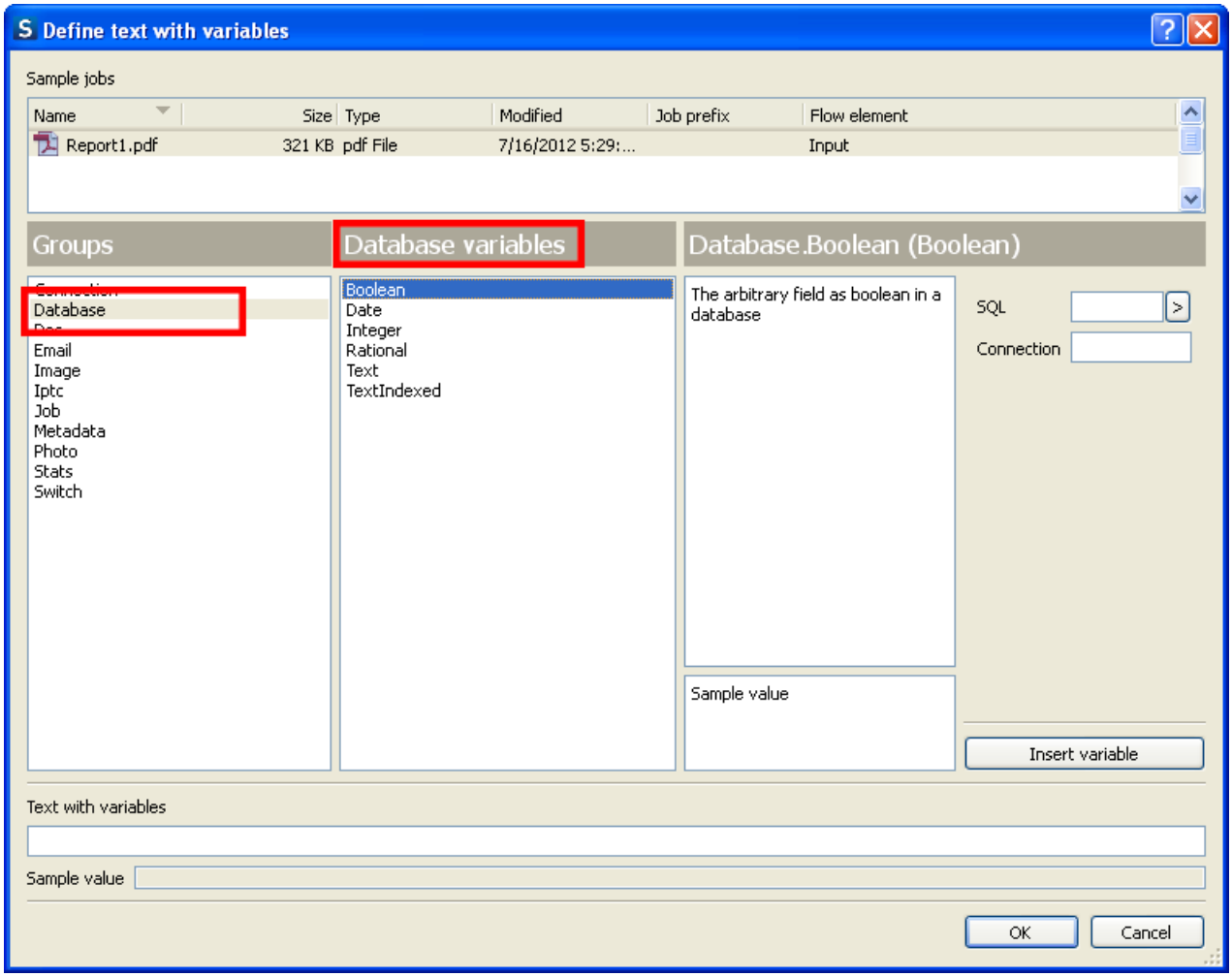
What are database variables?

Database variables are variables that at run-time are replaced with values from a database. These variables can only be used if you have an active license for the Switch Databases Module.

You can use the database variables in the same way as the regular Switch variables:

- Use them as values for the *tools and the configurator* properties.
- Use them as values for *conditions*, for example to filter jobs on a connection.
- Use them as values to fill a drop-down menu in the Submit point and Checkpoint *metadata* properties.

They are also accessible in the same way as other variables, i.e. via the **Define Text/Condition with Variables** option in the properties of the Switch tools. They are collected in a separate group: the "Database" variable group (see screenshot).



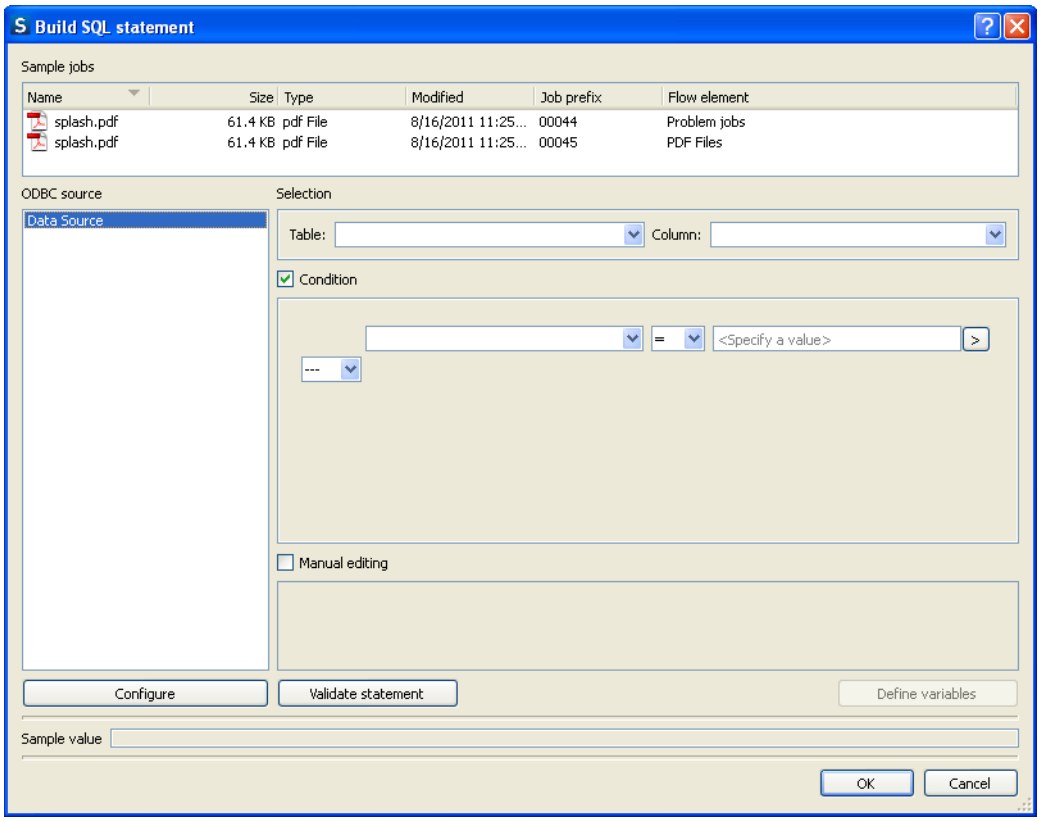
The table below lists the available data types.

Variable name	Data type
Database.Text	Text
Database.TextIndexed	Text Indexed
Database.Boolean	Boolean
Database.Integer	Integer
Database.Rational	Rational
Database.Date	Date

How to build an SQL statement?

After you have selected the Database group in the first column, and the data type in the second column, you must create an SQL statement. The Build SQL statement dialog box (see screenshot) will assist you in creating the SELECT statement and obtaining the appropriate values from the database.

Tip: We recommend using a sample job, so you can see immediately if your SQL statement is valid and correct.



To build an SQL statement, proceed as follows:

1. Click the button beside the **SQL** textbox and choose **Build SQL statement**.
2. Select a data source.
   a. Click the **Configure** button.
   b. In the **ODBC data sources** dialog, select a data source from the list of predefined data sources (Refer to *ODBC data sources* for more information on how to define the data sources).
3. Select a table and a column in the **Table** and the **Column** drop-down menus.
4. Select the **Condition** checkbox and specify or select the conditions in the first and the third menu, choose the comparison operator in the middle drop-down menu and choose the AND or OR logical operator in the last drop-down menu.
5. Alternatively, in order to choose more than one column or to choose a column from any other table or not to choose any columns, select the **Manual editing** checkbox and enter the statement manually.
6. After setting the SQL statement, click the **Validate statement** button to check if the query is valid. If the query returns any value or error, it is displayed on screen. The **Sample value** menu displays the sample value for a query. If a query returns multiple values, they will be listed in a comma separated list. For example: "val11,val12,val21,val22...".

7. Click the **OK** button to insert the statement.

5.5.6. SwitchClient Module

SwitchClient is a Switch module allowing users to access the Switch Server remotely, via Submit points (to submit jobs) and Checkpoints (to monitor jobs).

With an active license of the SwitchClient Module, users can for example:

- Connect to one or more Switch Servers on the local network/internet.
- Submit jobs (files or job folders) and metadata describing these jobs to a Submit point in a flow.
- Review and act on jobs being held in a Checkpoint in a flow.
- View progress information and the status of submitted jobs.
- Access the REST API and build a custom Job Client.

Good to know

- Switch 2017 and Switch 2018 support two versions of SwitchClient: the old 'legacy' desktop application and a new web-based version. The *job client type* option (in the Internal Communication preferences) determines which one is used:
  - *Legacy* (default value for upgrade installations) refers to the old SwitchClient desktop application. For all information concerning this version, refer to the Switch 13 Reference Guide.
  - *Default* (default value for all new installations) refers to the new web-based job client, which allows submitting and checking jobs through the Switch Web Portal. For all information concerning this version, refer to *the Switch Web Portal documentation*.
- Access to particular Submit points and Checkpoints can be restricted, by configuring access rights at user or user group level. For more information, refer to *Configuring Switch users* on page 59.
- Metadata information attached to a job can be used to make automated routing decisions or to provide variable input to various tools and configurators.
- SwitchClient comes with a documented REST API, which enables our customers to build their own Switch client tailored to their specific needs. The API can be accessed without a licensed Web Services module for *limited, internal usage*. For extended usage, e.g. customers wanting to make a Submit point available online, the Web Services module is required; otherwise their end users will run into an "API limit reached" error.

5.5.7. Switch Web Services

The Switch Web Services is a REST-based development tool designed to create custom Switch client interfaces within existing applications or web-based interfaces. This can be useful for external users when they need access to jobs or workflows, or in cases where access to jobs needs to be built into existing application interfaces.

For more information on the Switch Web Services, please contact your local Enfocus reseller or contact Enfocus directly.

5.5.8. Reporting Module

The Reporting Module allows you to create, display and share dashboards on the Switch Web Portal. You can configure the data you want to use (by defining job boards) and choose from different widgets to display live data or historical data (to get statistics).

For more information, refer to the chapter on *Managing dashboards on the Switch Web Portal* on page 320.

5.6. Stopping the Switch Server

For maintenance reasons, it may be necessary to shut down the Switch Server.

To stop the Switch Server

1. Launch Switch with a local Designer.
2. From the **File** menu, select **Stop Switch Server**.

Note: Note the difference with the option **Stop processing**, which only causes the Switch Server to stop processing flows.

The Switch Server is terminated and the Designer is closed. Remote Designers will not be able to connect to the Switch Server. Connecting with a local Designer will restart the Server.

5.7. Quitting Switch

Quitting Switch means exiting the Switch Designer.

The behavior of the Switch Server (whether or not it is stopped when quitting) depends on the setting of **When exiting the flow designer** in the *Switch preferences: User interface* on page 34.

To quit Switch

Do one of the following:

- Click the **Close** button ( ) in the top right corner of the application.
- (Windows) From the **File** menu, select **Quit Switch**.
- (Mac) From the **Enfocus Switch** menu, select **Quit Enfocus Switch**.

6. The Switch Insight Dashboard

The Switch Insight Dashboard is a dashboard that allows you to visualize the usage of your Switch. The charts on this dashboard will for example show you:

- How many files were processed by the Switch Server.
- How many problem jobs were found.
- Which flows and flow elements were used most.
- Which file types were processed most.
- Which production times were busy and which weren't.
- etc.

The Switch Insight Dashboard is free for maintenance users. Note however, that you should explicitly opt in via the Insight Dashboard menu option in Switch (see *Enabling your Switch Insight Dashboard* on page 461). Otherwise, the Switch Insight Dashboard won't be made available.

Once you have opted in, you can consult your Switch Insight Dashboard from within Switch or via the account section on enfocus.com (see *Consulting your Switch Insight Dashboard* on page 462).

Note that this Dashboard is visible to all Switch managers:

- Anyone who has signed in at least once to the Switch Designer.
- Anyone who has been added as Switch manager via the account section on enfocus.com (see *Adding a Switch manager* on page 307).

6.1. Enabling your Switch Insight Dashboard

Enfocus provides a free, personal Switch Insight Dashboard with weekly statistics, exclusively for its Switch maintenance customers.

To make use of this feature, proceed as follows:

1. Make sure you're signed into Switch with your Enfocus ID.

   You can sign in through the About Enfocus Switch dialog (Sign in tab):

   - On Windows, go to **Help** > **About Switch**
   - On Mac, go to **Enfocus Switch** > **About Enfocus Switch**

     This is necessary because your Switch Insight Dashboard will be linked to your Enfocus ID (and Switch Server).

2. Click **Insight Dashboard** > **Opt in/Opt out**.
3. Read the information and click **Yes, I'd like my Dashboard**.

Your personal Dashboard is prepared and will be available the next day. Note that you can opt out whenever you want (via the same menu).

6.2. Consulting your Switch Insight Dashboard

Once you have enabled your Switch Insight Dashboard, you have access to charts and statistics about your usage of Switch. There are two ways to consult your Insight Dashboard:

- From within Switch: Click **Insight Dashboard** > **My Switch Insight Dashboard**.
- Via the Enfocus website:

  1. Go to *http://www.enfocus.com*.
  2. In the top right corner, click **Sign in**.
  3. Enter your Enfocus ID and password and click **Sign in**.
  4. Click your username to open the account section.
  5. Click **My Dashboards** > **My Switch Insight Dashboard**.

Note that you can make your Switch Insight Dashboard visible to other users, by making them manager of your Switch (see *Adding a Switch manager* on page 307). Remember however that this also gives them other permissions (e.g. to buy apps).

7. Advanced topics

7.1. Switch performance tuning

The performance of Switch is affected by the processes that are being executed, such as *file handling*, *network transfers* and *external processes*.

To avoid that Switch slows down because too many processes are running at the same time, there are limits set to the number of concurrent processes. Changing these limits allows you to tune the Switch performance.

Note: Do not forget that other aspects, such as computer specifications and network speed can also affect overall performance.

File handling tasks

Handling files, such as copying or moving files and folders is limited to 5 simultaneous tasks (see *Execution slots* on page 297). It is *not* possible to change this number of concurrent file transfers.

Flow elements involved:

- Export metadata
- Job dismantler
- Recycle bin
- XML pickup, JDF pickup, XMP pickup, Opaque pickup
- Problem jobs
- Submit hierarchy
- Submit point
- Checkpoint
- Generic application
- XSLT Transform
- Archive hierarchy
- File type
- Folder element

Network transfer tasks

The number of concurrent network file transfers can be set in the Switch preferences (**Preferences** > **Processing** > **Concurrent network transfer tasks**). The default is set to 2 and the maximum limit is 100.

Flow elements involved:

- FTP send
- FTP receive
- Mail send
- Mail receive
- Checkpoint via mail

File processing tasks
The number of tasks required to process files by using one of the flow elements listed below simultaneously can be set in the Switch preferences (**Preferences** > **Processing** > **Concurrent processing tasks**).

By default this preference is set to 4 simultaneous processes (that is the maximum available with a regular Switch Core Engine license), but licensing additional processes can expand this limit to a maximum of 100.

Flow elements involved:

- All flow elements in the Apps and Configurators sections
- The following elements in the Basics section:
  - Set hierarchy path
  - Ungroup job
  - Split multi-job
  - Assemble job
  - Execute command
- The following elements in the Tools section:
  - Sort by preflight state
  - Archive
  - Unarchive
  - Split PDF
  - Merge PDF
  - Hold job
  - Inject job
  - Rename job
  - Sort job
  - Log job info
  - Sort files in job
- The Script element in the Scripting section:

  Custom scripts are affected by the "Concurrent processing tasks" preference as soon as the script is a "heavy script". A script is considered to be "heavy", if it takes longer than one second to execute.

  Light scripts, timerFired and webhookTriggered calls belong to separate categories and these processes are calculated in a different way. For more details, see *Execution slots* on page 297.

  Note:

  - Custom scripts using AppleScript can never be executed simultaneously. Since the Quark Xpress and Microsoft Word Configurators (on Mac) use AppleScript, it is not possible to run both the Quark Xpress and Microsoft Word Configurator and a custom script using AppleScript at the same time. Switch will always process jobs through these elements in a serial way.
  - Starting from Switch 2017, it is no longer possible to create new scripts using AppleScript. However, Switch 2017 and 2018 will still be able to execute the scripts created in older Switch versions.

- The following elements in the Communication section:
  - HTTP request

  - Pack job
  - Unpack job
  - Monitor confirmation
- The XMP inject element in the Metadata section.
- The Database connect element in the Database section.
- The following elements in the Legacy section:
  - Compress
  - Uncompress

Accumulative limitation

Each task listed has its own upper limit. In addition to this, Switch is limited to an upper limit of 200 for all simultaneous tasks. This is the accumulation of File Handling, Network Transfers and External processes.

For more information on Switch Preferences see *User Preferences*.

For more information on tuning performance for file processing tasks, see *Changing flow properties*.

7.2. Data Collecting Wizard

About the Data Collecting Wizard

The Data collecting wizard is a tool that automatically collects the Switch data files, which are requested by the Enfocus Support team when they need more information on your Switch setup.

The tool collects the following data:

- Flows
- Preference files
- Job tickets
- logs .db3 file (ServerLogs.db3)
- Information about the Switch files installed on the user's system (layout, name, size, modification date)
- Relevant registry/plist records
- Information from the **Support** tab in the **About** dialog box
- Job datasets

The tool creates a zip package that can be sent to the Enfocus Support team.

Note: As the file size might be an issue (the .db3 files may be a few GB in size and the jobtickets may be a 100MB or more), you can as a user exclude certain data files from the collection.

Two versions

The Data Collecting Wizard is provided in two versions:

- **A stand-alone version** (**SwitchDataCollector.exe or SwitchDataCollector.app**), available in the Switch installation folder.
  - *Windows*: C:\Program Files (x86)\Enfocus\Enfocus Switch <version number>

- *Mac OS*: /Applications/Enfocus/Enfocus Switch <version number>

- A **built-in version**, available from within Switch through the File menu (**File** > **Collect application data**).

The main difference between the two versions, is the way the flows are collected. Flows in a Switch installation are a combination of XML and Property sets in various folders. When a user chooses "Export" in the Designer UI, the XML and Property sets are combined in a file with extension .sflow. As this logic is difficult to extract outside Server, the *stand-alone version does not offer the .sflow files (only the raw XML and Property sets)*. Besides, in the stand-alone version you have to collect either all or none of the .sflow files. You cannot make a selection.

Apart from that, only the stand-alone version allows you to collect data if Switch is not launched or cannot be launched anymore for any reason. If Switch is running, you are asked to quit.

Using the Data Collecting Wizard

Refer to *Collecting application data* on page 466.

7.2.1. Collecting application data

To collect the Switch application data

1. Do one of the following:
   - Locate the SwitchDataCollector in the Switch installation directory (make sure Switch is closed!).
   - In Switch, choose **File** > **Collect application data**.

   For more information about the difference, refer to *Data Collecting Wizard* on page 465.

   The Switch Data Collecting Wizard Welcome screen appears.

2. Click **Next**.

3. Select the data you want to include in the resulting zip package.

   You have the following choices:

   - **Logs**: Server logs in a .db3 file (entire folder "<app_data_root>\logs")

   - **Preferences**: Switch preferences XML (entire folder "<app_data_root>\settings")

   - **Datasets**: Jobs datasets (entire folder "<app_data_root>\datasets")

   - **Application settings**: Switch settings extracted from the registry (on Windows) or plist files (on Mac). The extracted data is put into an ApplicationSettings.txt file. On Mac, actual plist files are also included in the zip. This checkbox cannot be cleared.

   - **Layout description**: Description of Switch installation files, saved into a file called 'Report.txt'. It includes a listing of all files and folders with their attributes (size, modification date, permissions etc.) from the Switch installation folder. This checkbox cannot be cleared.

   - **Internal log messages**: Internal log files for all processes with a more detailed description of errors and operations. This checkbox cannot be cleared.

Note: If the file size becomes too big or if collecting files takes too much time, you may want to exclude certain data types.

4. Choose a destination for the resulting zip package and click **Next**.

   You can as well change the name of the zip package as required. The default name has the following format: "Switch Data "<current date> <nn-nn-nn>.zip", e.g. Switch Data 2015-09-14 10-29-30.zip.

5. Select the flows you want to collect and click **Next**.

   If you're using the stand-alone version of the tool, you must either select all flows or none; it's not possible to select a subset.

   Îf you're using the Designer version, all flows are displayed in alphabetical order. They are selected by default, but you can clear the ones you don't need. Note that advanced features (like grouping, sorting, flags etc) are not supported.

   A summary of the chosen options is shown. You can still make changes as required by clicking the **Back** button.

6. Click **Commit**.
   The data collection starts.

   Note:

   - If the wizard is launched from the Switch Designer, it deactivates all active flows, before collecting the data. Afterwards, the flows are re-activated.
   - You can stop the data collection (for example if it takes too much time) by clicking **Abort**. However, aborting can be performed only between steps, for example: between collecting flows and exporting logs. The Wizard will wait until the previous step is finished and will only then abort the collection process.

7. Once the zip package has been created, click **Close**.
   The zip package is placed in the location chosen in step 4. The structure is very simple: each data part is placed in a separate subfolder, e.g. Application Data, ExportedFlows, Report, and Settings. The content of the Application Data subfolder mirrors the contents of the actual Switch application data root.

   If the wizard was launched from Switch, the Report folder will contain a file named "AboutDialog.txt, which contains information extracted from the **About** box in Designer.

8. Need more help?

1. Consult the product documentation

Documentation	Description	Where to find?
Quick Start Guide	Switch basic information Consult this guide if you're new to Switch.	Go to *the Switch manuals on the Enfocus website*. Alternatively, to go there from within the application, select the **Help** > **Online resources** > **Online documentation** menu.
Reference Guide	Switch detailed information and advanced topics	Go to *the Switch manuals on the Enfocus website*. Alternatively, to open the help from within the application, press **F1** or select the **Help** > **Switch help** menu.
Switch Scripting Documentation	Switch scripting reference	Go to *the Switch manuals on the Enfocus website*. Alternatively, to go there from within the application, select the **Help** > **Online resources** > **Online documentation** menu.
Example Scripts	Example scripts, with a short explanation and the option to download	Go to *the Switch manuals on the Enfocus website*. Alternatively, to go there from within the application, select the **Help** > **Online resources** > **Online documentation** menu.
Configurator Documentation	Documentation about the Switch configurators	To get information about a configurator **1.** Open Switch in a workspace view. **2.** In the Flow elements pane, right-click a configurator. **3.** Click **Documentation...**

2. Consult the Solution articles in the Enfocus knowledge base

The Enfocus knowledge base provides answers to frequently asked questions, workarounds, and tips and tricks.

To access the knowledge base, go to: *https://www.enfocus.com/en/support/known-issues-and-solutions*.

Note: Alternatively, you can go there from within Switch, by selecting the **Help** > **Solution articles** menu.

3. Visit the Switch Partner integrations overview

As of June 2016, Crossroads, the community portal around Enfocus Switch, has been replaced with the Switch Partner integrations overview on the Enfocus website. Here you can find all information about partner integrations and download flows and configurators.

You can use the following link: *https://www.enfocus.com/en/products/switch/partner-integrations*.

Note: Alternatively, you can access this overview from within the application, by selecting the **Help** > **Online resources** > **Partner integrations** menu.

4. Visit the Enfocus Community

The Enfocus Community is a forum where you can exchange ideas with other users of Enfocus software.

URL: *http://forum.enfocus.com/*

5. Contact your reseller

A list of authorized resellers is available on the Enfocus web site (*http://www.enfocus.com/FindReseller.php*).

6. Contact Enfocus customer support

If you cannot find the answer to your question in Switch help or on the web, create a case on the website at *http://www.enfocus.com/supportportal*.

9. Copyrights

© 2019 Enfocus BVBA all rights reserved. Enfocus is an Esko company.

Certified PDF is a registered trademark of Enfocus BVBA.

Enfocus PitStop Pro, Enfocus PitStop Workgroup Manager, Enfocus PitStop Server, Enfocus Connect YOU, Enfocus Connect ALL, Enfocus Connect SEND, Enfocus StatusCheck, Enfocus CertifiedPDF.net, Enfocus PDF Workflow Suite, Enfocus Switch, Enfocus SwitchClient, Enfocus SwitchScripter and Enfocus Browser are product names of Enfocus BVBA.

Adobe, Acrobat, Distiller, InDesign, Illustrator, Photoshop, FrameMaker, PDFWriter, PageMaker, Adobe PDF Library™, the Adobe logo, the Acrobat logo and PostScript are trademarks of Adobe Systems Incorporated.

Datalogics, the Datalogics logo, PDF2IMG™ and DLE™ are trademarks of Datalogics, Inc.

Apple, Mac, Mac OS, Macintosh, iPad and ColorSync are trademarks of Apple Computer, Inc. registered in the U.S. and other countries.

Windows, Windows 2000, Windows 7, Windows 8, Windows 8.1, Windows 10, Windows 2008 Server, Windows 2008 Server R2, Windows Server 2012, Windows Server 2012 R2 and Windows Server 2016 are registered trademarks of Microsoft Corporation.

PANTONE® Colors displayed here may not match PANTONE-identified standards. Consult current PANTONE Color Publications for accurate color. PANTONE® and other Pantone, Inc. trademarks are the property of Pantone, Inc. ©Pantone, Inc., 2006.

OPI is a trademark of Aldus Corporation.

Monotype is a trademark of Monotype Imaging Inc. registered in the U.S. Patent and Trademark Office and may be registered in certain jurisdictions. Monotype Baseline is a trademark of Monotype Imaging Inc.

Quark, QuarkXPress, QuarkXTensions, XTensions and the XTensions logo among others, are trademarks of Quark, Inc. and all applicable affiliated companies, Reg. U.S. Pat. & Tm. Off. and in many other countries.

This product and use of this product is under license from Markzware under U.S.Patent No. 5,963,641.

Other brand and product names may be trademarks or registered trademarks of their respective holders. All specifications, terms and descriptions of products and services are subject to change without notice or recourse.

10. Third-Party License Information

The third-party applications included in Switch are listed below. Additional information about third-party licenses can be found in the Resources > Licenses subfolder of the Switch installation folder.

```
This product includes Botan.

      Copyright (C) 1999-2009 Jack Lloyd
      2001 Peter J Jones
      2004-2007 Justin Karneges
      2004 Vaclav Ovsik
      2005 Matthew Gregan
      2005-2006 Matt Johnston
      2006 Luca Piccarreta
      2007 Yves Jerschow
      2007-2008 FlexSecure GmbH
      2007-2008 Technische Universitat Darmstadt
      2007-2008 Falko Strenzke
      2007-2008 Martin Doering
      2007 Manuel Hartl
      2007 Christoph Ludwig
      2007 Patrick Sona
      2010 Olivier de Gaalon
      All rights reserved.

      Redistribution and use in source and binary forms, with or without
      modification, are permitted provided that the following conditions are
      met:

      1. Redistributions of source code must retain the above copyright
      notice, this list of conditions, and the following disclaimer.

      2. Redistributions in binary form must reproduce the above copyright
      notice, this list of conditions, and the following disclaimer in the
      documentation and/or other materials provided with the distribution.

      THIS SOFTWARE IS PROVIDED BY THE AUTHOR(S) "AS IS" AND ANY EXPRESS OR
      IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED
      WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE,
      ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR(S) OR CONTRIBUTOR(S) BE
      LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR
      CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF
      SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR
      BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY,
      WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE
      OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN
      IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

-------------------------------------------------------------

This product includes ICC Profiles.

    Some ICC Profiles were created by FFEI Ltd. (www.ffei.co.uk) using Fujifilm
    ColourKit Profiler Suite (www.colourprofiling.com)

-------------------------------------------------------------

This product includes ICC Profiles.

    Some ICC profiles are copyright (C) by European Color Initiative, www.eci.org

-------------------------------------------------------------

This product includes ICC Profiles.

    Some ICC profiles are copyright (C) of WAN-IFRA, www.wan-ifra.org

-------------------------------------------------------------

This product includes ICC Profiles.
```

Some ICC profiles are copyright (C) IDEAlliance(R). G7(R), GRACol(R) and
SWOP(R) are all registered trademarks of IDEAlliance(C).

This product includes PANTONE Color Libraries.

PANTONE® and other Pantone trademarks are the property of Pantone LLC.
Pantone is a wholly owned subsidiary of X-Rite, Incorporated.

This product includes curl.

Copyright (c) 1996 - 2015, Daniel Stenberg, <daniel@haxx.se>.
All rights reserved.

Permission to use, copy, modify, and distribute this software for any purpose
with or without fee is hereby granted, provided that the above copyright
notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN
NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM,
DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR
OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE
OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not
be used in advertising or otherwise to promote the sale, use or other dealings
in this Software without prior written authorization of the copyright holder.

This product includes LibTIFF.

Copyright (c) 1988-1997 Sam Leffler
Copyright (c) 1991-1997 Silicon Graphics, Inc.

Permission to use, copy, modify, distribute, and sell this software and
its documentation for any purpose is hereby granted without fee, provided
that (i) the above copyright notices and this permission notice appear in
all copies of the software and related documentation, and (ii) the names of
Sam Leffler and Silicon Graphics may not be used in any advertising or
publicity relating to the software without the specific, prior written
permission of Sam Leffler and Silicon Graphics.

THE SOFTWARE IS PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND,
EXPRESS, IMPLIED OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY
WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL SAM LEFFLER OR SILICON GRAPHICS BE LIABLE FOR
ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND,
OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS,
WHETHER OR NOT ADVISED OF THE POSSIBILITY OF DAMAGE, AND ON ANY THEORY OF
LIABILITY, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE
OF THIS SOFTWARE.

This product includes Minizip.

Copyright (C) 1998-2005 Gilles Vollant
Modifications of Unzip for Zip64
Copyright (C) 2007-2008 Even Rouault
Modifications for Zip64 support on both zip and unzip
Copyright (C) 2009-2010 Mathias Svensson
http://result42.com
Modifications for AES, PKWARE disk spanning
Copyright (C) 2010-2014 Nathan Moinvaziri

This software is provided 'as-is', without any express or implied
warranty. In no event will the authors be held liable for any damages
arising from the use of this software.

```
------------------------------------------------------------

This product includes zlib.

      Copyright (C) 1995-2004 Jean-loup Gailly and Mark Adler

      This software is provided 'as-is', without any express or implied
      warranty.  In no event will the authors be held liable for any damages
      arising from the use of this software.

------------------------------------------------------------

This product includes FreeType.

    Portions of this software are copyright (C) 2014 The FreeType
    Project (www.freetype.org) licensed under the Freetype License.
    All rights reserved.

------------------------------------------------------------

This product includes Google Breakpad.

      Copyright (c) 2006, Google Inc. All rights reserved.

      Redistribution and use in source and binary forms, with or without
      modification, are permitted provided that the following conditions are
      met:
      * Redistributions in binary form must reproduce the above
      copyright notice, this list of conditions and the following disclaimer
      in the documentation and/or other materials provided with the
      distribution.
      * Neither the name of Google Inc. nor the names of its
      contributors may be used to endorse or promote products derived from
      this software without specific prior written permission.

      THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
      "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
      LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
      A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
      OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
      SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
      LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
      DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
      THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
      (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
      OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes curl.

      Copyright (c) 1996 - 2011, Daniel Stenberg, <daniel@haxx.se>.
      All rights reserved.

      Permission to use, copy, modify, and distribute this software for any purpose
      with or without fee is hereby granted, provided that the above copyright
      notice and this permission notice appear in all copies.

      THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
      IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
      FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN
      NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM,
      DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR
      OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE
      OR OTHER DEALINGS IN THE SOFTWARE.

------------------------------------------------------------

This product includes Google Logging Library (glog).

      Copyright (c) 2008, Google Inc.
      All rights reserved.

      Redistribution and use in source and binary forms, with or without
      modification, are permitted provided that the following conditions are
      met:
      * Redistributions of source code must retain the above copyright
```

```
      notice, this list of conditions and the following disclaimer.
      * Redistributions in binary form must reproduce the above
      copyright notice, this list of conditions and the following disclaimer
      in the documentation and/or other materials provided with the
      distribution.
      * Neither the name of Google Inc. nor the names of its
      contributors may be used to endorse or promote products derived from
      this software without specific prior written permission.

      THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
      "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
      LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
      A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
      OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
      SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
      LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
      DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
      THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
      (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
      OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes Protocol Buffers.

      Copyright (c) 2008, Google Inc.
      All rights reserved.

      Redistribution and use in source and binary forms, with or without
      modification, are permitted provided that the following conditions are
      met:

      * Redistributions in binary form must reproduce the above
      copyright notice, this list of conditions and the following disclaimer
      in the documentation and/or other materials provided with the
      distribution.
      * Neither the name of Google Inc. nor the names of its
      contributors may be used to endorse or promote products derived from
      this software without specific prior written permission.

      THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
      "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
      LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
      A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
      OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
      SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
      LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
      DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
      THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
      (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
      OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes gSOAP.

      EXHIBIT B.

      Part of the software embedded in this product is gSOAP software.
      Portions created by gSOAP are Copyright (C) 2001-2007 Robert A. van Engelen,
 Genivia inc. All Rights Reserved.

      THE SOFTWARE IN THIS PRODUCT WAS IN PART PROVIDED BY GENIVIA INC AND ANY EXPRESS
 OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF
 MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT
 SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY,
 OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE
 GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER
 CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR
 TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS
 SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes ICU.

      Copyright (c) 1995-2014 International Business Machines Corporation and others
```

```
      All rights reserved.

      Permission is hereby granted, free of charge, to any person obtaining a copy of
      this software and associated documentation files (the "Software"), to deal in
 the
      Software without restriction, including without limitation the rights to use,
      copy, modify, merge, publish, distribute, and/or sell copies of the Software,
 and
      to permit persons to whom the Software is furnished to do so, provided that the
      above copyright notice(s) and this permission notice appear in all copies of the
      Software and that both the above copyright notice(s) and this permission notice
      appear in supporting documentation.

      THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
      IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS
      FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT
      SHALL THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE BE LIABLE FOR ANY
      CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES
      WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF
      CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION
      WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

------------------------------------------------------------

This product includes iODBC.

      Copyright (C) 1995-2006, OpenLink Software Inc and Ke Jin.
      All rights reserved.

      Redistribution and use in source and binary forms, with or without
      modification, are permitted provided that the following conditions
      are met:

       1. Redistributions of source code must retain the above copyright notice,
          this list of conditions and the following disclaimer.
       2. Redistributions in binary form must reproduce the above copyright
          notice, this list of conditions and the following disclaimer in the
          documentation and/or other materials provided with the distribution.
       3. Neither the name of OpenLink Software Inc. nor the names of its
          contributors may be used to endorse or promote products derived from
          this software without specific prior written permission.

      THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
      "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO,
      THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR
      PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL OPENLINK OR CONTRIBUTORS
      BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY,
      OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF
      SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS
      INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
      CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
      ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF
      THE POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes JBIG2Lib.

    Portions of this product copyrights (C) 2002 Glyph & Cog, LLC.

------------------------------------------------------------

This product includes JPEGLib.
This software is copyright (C) 1991-2016, Thomas G. Lane, Guido Vollbeding.
      All Rights Reserved.

      This software is based in part on the work of the Independent JPEG Group.
------------------------------------------------------------

This product includes Little CMS.

    Little CMS
    Copyright (c) 1998-2011 Marti Maria Saguer

    Permission is hereby granted, free of charge, to any person obtaining a copy
    of this software and associated documentation files (the "Software"), to deal
    in the Software without restriction, including without limitation the rights
```

```
    to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
    copies of the Software, and to permit persons to whom the Software is
    furnished to do so, subject to the following conditions:

    The above copyright notice and this permission notice shall be included in
    all copies or substantial portions of the Software.

    THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
    IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
    FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
    AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER
    LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM,
    OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN
    THE SOFTWARE.

------------------------------------------------------------

This product includes libpng.

      Copyright (c) 2000-2002 Glenn Randers-Pehrson

      The PNG Reference Library is supplied "AS IS".  The Contributing Authors
      and Group 42, Inc. disclaim all warranties, expressed or implied,
      including, without limitation, the warranties of merchantability and of
      fitness for any purpose.  The Contributing Authors and Group 42, Inc.
      assume no liability for direct, indirect, incidental, special, exemplary,
      or consequential damages, which may result from the use of the PNG
      Reference Library, even if advised of the possibility of such damage.
      There is no warranty against interference with your enjoyment of the
      library or against infringement.  There is no warranty that our
      efforts or the library will fulfill any of your particular purposes
      or needs.  This library is provided with all faults, and the entire
      risk of satisfactory quality, performance, accuracy, and effort is with
      the user.

------------------------------------------------------------

This product includes libxml2.

    Copyright (C) 1998-2012 Daniel Veillard.  All Rights Reserved.

    Permission is hereby granted, free of charge, to any person obtaining a copy
    of this software and associated documentation files (the "Software"), to deal
    in the Software without restriction, including without limitation the rights
    to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
    copies of the Software, and to permit persons to whom the Software is fur-
    nished to do so, subject to the following conditions:

    The above copyright notice and this permission notice shall be included in
    all copies or substantial portions of the Software.

    THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
    IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FIT-
    NESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT.  IN NO EVENT SHALL THE
    AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER
    LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM,
    OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN
    THE SOFTWARE.

------------------------------------------------------------

This product includes mongodb.

        Copyright (c) 2016 MongoDB, Inc.

        This program is free software: you can redistribute it and/or modify
    it under the terms of the GNU Affero General Public License as published by
    the Free Software Foundation, either version 3 of the License, or
    (at your option) any later version.

    This program is distributed in the hope that it will be useful,
    but WITHOUT ANY WARRANTY; without even the implied warranty of
    MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
    GNU Affero General Public License for more details.

------------------------------------------------------------
```

This product includes IP*Works!.

Copyright (c) 2017 /n software inc. - All rights reserved.

DISCLAIMER OF WARRANTY. THE LICENSED SOFTWARE IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. FURTHER, /N SOFTWARE SPECIFICALLY DOES NOT WARRANT, GUARANTEE, OR MAKE ANY REPRESENTATIONS REGARDING THE USE, OR THE RESULTS OF THE USE, OF THE LICENSED SOFTWARE OR DOCUMENTATION IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY, CURRENTNESS, OR OTHERWISE. THE ENTIRE RISK AS TO THE RESULTS AND PERFORMANCE OF THE LICENSED SOFTWARE IS ASSUMED BY YOU. NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY /N SOFTWARE OR ITS EMPLOYEES SHALL CREATE A WARRANTY OR IN ANY WAY INCREASE THE SCOPE OF THIS WARRANTY, AND YOU MAY NOT RELY ON ANY SUCH INFORMATION OR ADVICE. FURTHER, THE LICENSED SOFTWARE IS NOT FAULT-TOLERANT AND IS NOT DESIGNED, MANUFACTURED OR INTENDED FOR USE OR RESALE AS ON-LINE CONTROL EQUIPMENT IN HAZARDOUS ENVIRONMENTS REQUIRING FAIL-SAFE PERFORMANCE, SUCH AS IN THE OPERATION OF NUCLEAR FACILITIES, AIRCRAFT NAVIGATION OR COMMUNICATION SYSTEMS, AIR TRAFFIC CONTROL, DIRECT LIFE SUPPORT MACHINES, OR WEAPONS SYSTEMS, IN WHICH THE FAILURE OF THE LICENSED SOFTWARE COULD LEAD DIRECTLY TO DEATH, PERSONAL INJURY, OR SEVERE PHYSICAL OR ENVIRONMENTAL DAMAGE ("HIGH RISK ACTIVITIES"). /N SOFTWARE AND ITS SUPPLIERS SPECIFICALLY DISCLAIM ANY EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR HIGH RISK ACTIVITIES.

LIMITATION ON LIABILITY. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT WILL /N SOFTWARE'S TOTAL AGGREGATE AND CUMULATIVE LIABILITY TO YOU FOR ANY AND ALL CLAIMS OF ANY KIND ARISING HEREUNDER EXCEED THE AMOUNT OF LICENSE FEES ACTUALLY PAID BY YOU FOR THE LICENSED SOFTWARE GIVING RISE TO THE CLAIM IN THE TWELVE MONTHS PRECEDING THE CLAIM. /N SOFTWARE'S LICENSORS AND THEIR SUPPLIERS SHALL HAVE NO LIABILITY TO YOU FOR ANY DAMAGES SUFFERED BY YOU OR ANY THIRD PARTY AS A RESULT OF USING THE LICENSED SOFTWARE, OR ANY PORTION THEREOF. NOTWITHSTANDING THE FOREGOING, IN NO EVENT SHALL /N SOFTWARE, ITS LICENSORS, OR ANY OF THEIR RESPECTIVE SUPPLIERS BE LIABLE FOR ANY LOST REVENUE, PROFIT OR DATA, OR FOR INDIRECT, PUNITIVE, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER, INCLUDING, WITHOUT LIMITATION, ANY COMMERCIAL DAMAGES OR LOSSES, HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY, ARISING OUT OF THE USE OR INABILITY TO USE THE LICENSED SOFTWARE, OR ANY PORTION THEREOF, EVEN IF /N SOFTWARE, ITS LICENSORS AND/OR ANY OF THEIR RESPECTIVE SUPPLIERS HAVE BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY. EACH EXCLUSION OF LIMITATION IS INTENDED TO BE SEPARATE AND THEREFORE SEVERABLE.

This product includes IP*Works! SSH.

Copyright (c) 2017 /n software inc. - All rights reserved.

DISCLAIMER OF WARRANTY. THE LICENSED SOFTWARE IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. FURTHER, /N SOFTWARE SPECIFICALLY DOES NOT WARRANT, GUARANTEE, OR MAKE ANY REPRESENTATIONS REGARDING THE USE, OR THE RESULTS OF THE USE, OF THE LICENSED SOFTWARE OR DOCUMENTATION IN TERMS OF CORRECTNESS, ACCURACY, RELIABILITY, CURRENTNESS, OR OTHERWISE. THE ENTIRE RISK AS TO THE RESULTS AND PERFORMANCE OF THE LICENSED SOFTWARE IS ASSUMED BY YOU. NO ORAL OR WRITTEN INFORMATION OR ADVICE GIVEN BY /N SOFTWARE OR ITS EMPLOYEES SHALL CREATE A WARRANTY OR IN ANY WAY INCREASE THE SCOPE OF THIS WARRANTY, AND YOU MAY NOT RELY ON ANY SUCH INFORMATION OR ADVICE. FURTHER, THE LICENSED SOFTWARE IS NOT FAULT-TOLERANT AND IS NOT DESIGNED, MANUFACTURED OR INTENDED FOR USE OR RESALE AS ON-LINE CONTROL EQUIPMENT IN HAZARDOUS ENVIRONMENTS REQUIRING FAIL-SAFE PERFORMANCE, SUCH AS IN THE OPERATION OF NUCLEAR FACILITIES, AIRCRAFT NAVIGATION OR COMMUNICATION SYSTEMS, AIR TRAFFIC CONTROL, DIRECT LIFE SUPPORT MACHINES, OR WEAPONS SYSTEMS, IN WHICH THE FAILURE OF THE LICENSED SOFTWARE COULD LEAD DIRECTLY TO DEATH, PERSONAL INJURY, OR SEVERE PHYSICAL OR ENVIRONMENTAL DAMAGE ("HIGH RISK ACTIVITIES"). /N SOFTWARE AND ITS SUPPLIERS SPECIFICALLY DISCLAIM ANY EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR HIGH RISK ACTIVITIES.

LIMITATION ON LIABILITY. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT WILL /N SOFTWARE'S TOTAL AGGREGATE AND CUMULATIVE LIABILITY TO YOU FOR ANY AND ALL CLAIMS OF ANY KIND ARISING HEREUNDER EXCEED THE AMOUNT OF LICENSE FEES ACTUALLY PAID BY YOU FOR THE LICENSED SOFTWARE GIVING RISE TO THE CLAIM IN THE TWELVE MONTHS PRECEDING THE CLAIM. /N SOFTWARE'S LICENSORS AND THEIR SUPPLIERS SHALL HAVE NO LIABILITY TO YOU FOR ANY DAMAGES SUFFERED BY YOU OR ANY THIRD PARTY AS A RESULT OF USING THE LICENSED SOFTWARE, OR ANY PORTION THEREOF. NOTWITHSTANDING THE FOREGOING, IN NO EVENT SHALL /N SOFTWARE, ITS LICENSORS, OR ANY OF THEIR RESPECTIVE SUPPLIERS BE LIABLE FOR ANY LOST REVENUE, PROFIT OR DATA, OR FOR INDIRECT, PUNITIVE, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER, INCLUDING, WITHOUT LIMITATION, ANY COMMERCIAL DAMAGES OR LOSSES, HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY, ARISING OUT OF THE USE OR INABILITY TO USE THE LICENSED SOFTWARE, OR ANY PORTION THEREOF, EVEN IF /N SOFTWARE, ITS LICENSORS AND/OR ANY OF THEIR RESPECTIVE

```
 SUPPLIERS HAVE BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT
 ALLOW THE EXCLUSION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS
 MAY NOT APPLY. EACH EXCLUSION OF LIMITATION IS INTENDED TO BE SEPARATE AND THEREFORE
 SEVERABLE.

------------------------------------------------------------

This product includes node-ipc.

      Version 1, December 2009

      Copyright (C) 2009 Philip Sturgeon email@philsturgeon.co.uk

------------------------------------------------------------

This product includes sprintf.

      Copyright (c) 2007-2013, Alexandru Marasteanu. All rights reserved.

      Redistribution and use in source and binary forms, with or without
      modification, are permitted provided that the following conditions are met:
      * Redistributions of source code must retain the above copyright
      notice, this list of conditions and the following disclaimer.
      * Redistributions in binary form must reproduce the above copyright
      notice, this list of conditions and the following disclaimer in the
      documentation and/or other materials provided with the distribution.
      * Neither the name of this software nor the names of its contributors may be
      used to endorse or promote products derived from this software without
      specific prior written permission.

      THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND
      ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED
      WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE
      DISCLAIMED. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR
      ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES
      (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES;
      LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND
      ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
      (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS
      SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes sqlite3.

Copyright (c) MapBox
All rights reserved.

Redistribution and use in source and binary forms, with or without modification,
are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this
  list of conditions and the following disclaimer.
- Redistributions in binary form must reproduce the above copyright notice, this
  list of conditions and the following disclaimer in the documentation and/or
  other materials provided with the distribution.
- Neither the name "MapBox" nor the names of its contributors may be
  used to endorse or promote products derived from this software without
  specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND
ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED
WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE
DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR
ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES
(INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES;
LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON
ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS
SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes OpenJPEG.

      Copyright (c) 2002-2012, Communications and Remote Sensing Laboratory,
 Universite catholique de Louvain (UCL), Belgium
```

```
      Copyright (c) 2002-2012, Professor Benoit Macq
      Copyright (c) 2003-2012, Antonin Descampe
      Copyright (c) 2003-2009, Francois-Olivier Devaux
      Copyright (c) 2005, Herve Drolon, FreeImage Team
      Copyright (c) 2002-2003, Yannick Verschueren
      Copyright (c) 2001-2003, David Janssens
      Copyright (c) 2011-2012, Centre National d'Etudes Spatiales (CNES), France
      Copyright (c) 2012, CS Systemes d'Information, France
      All rights reserved.

      Redistribution and use in source and binary forms, with or without
      modification, are permitted provided that the following conditions
      are met:
      1. Redistributions of source code must retain the above copyright
         notice, this list of conditions and the following disclaimer.
      2. Redistributions in binary form must reproduce the above copyright
         notice, this list of conditions and the following disclaimer in the
         documentation and/or other materials provided with the distribution.

      THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS `AS IS'
      AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE
      IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
      ARE DISCLAIMED.  IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE
      LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR
      CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF
      SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS
      INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN
      CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
      ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE
      POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes OpenSSL.

      Copyright (c) 1998-2017 The OpenSSL Project.  All rights reserved.

      Redistribution and use in source and binary forms, with or without
      modification, are permitted provided that the following conditions
      are met:

      1. Redistributions of source code must retain the above copyright
         notice, this list of conditions and the following disclaimer.

      2. Redistributions in binary form must reproduce the above copyright
         notice, this list of conditions and the following disclaimer in
         the documentation and/or other materials provided with the
         distribution.

      3. All advertising materials mentioning features or use of this
         software must display the following acknowledgment:
         "This product includes software developed by the OpenSSL Project
         for use in the OpenSSL Toolkit. (http://www.openssl.org/)"

      4. The names "OpenSSL Toolkit" and "OpenSSL Project" must not be used to
         endorse or promote products derived from this software without
         prior written permission. For written permission, please contact
         openssl-core@openssl.org.

      5. Products derived from this software may not be called "OpenSSL"
         nor may "OpenSSL" appear in their names without prior written
         permission of the OpenSSL Project.

      6. Redistributions of any form whatsoever must retain the following
         acknowledgment:
         "This product includes software developed by the OpenSSL Project
         for use in the OpenSSL Toolkit (http://www.openssl.org/)"

      THIS SOFTWARE IS PROVIDED BY THE OpenSSL PROJECT ``AS IS'' AND ANY
      EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE
      IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR
      PURPOSE ARE DISCLAIMED.  IN NO EVENT SHALL THE OpenSSL PROJECT OR
      ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
      SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
      NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES;
      LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
      HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT,
```

```
      STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
      ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED
      OF THE POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes OpenSSL.

      Copyright (C) 1995-1998 Eric Young (eay@cryptsoft.com)
      All rights reserved.

      Redistribution and use in source and binary forms, with or without
      modification, are permitted provided that the following conditions
      are met:
      1. Redistributions of source code must retain the copyright
         notice, this list of conditions and the following disclaimer.
      2. Redistributions in binary form must reproduce the above copyright
         notice, this list of conditions and the following disclaimer in the
         documentation and/or other materials provided with the distribution.
      3. All advertising materials mentioning features or use of this software
         must display the following acknowledgement:
         "This product includes cryptographic software written by
         Eric Young (eay@cryptsoft.com)"
         The word 'cryptographic' can be left out if the rouines from the library
         being used are not cryptographic related :-).
      4. If you include any Windows specific code (or a derivative thereof) from
         the apps directory (application code) you must include an acknowledgement:
         "This product includes software written by Tim Hudson (tjh@cryptsoft.com)"

      THIS SOFTWARE IS PROVIDED BY ERIC YOUNG ``AS IS'' AND
      ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE
      IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE
      ARE DISCLAIMED.  IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE
      FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL
      DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS
      OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
      HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT
      LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY
      OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
      SUCH DAMAGE.

------------------------------------------------------------

This product includes patented technology.

      This product and use of this product is under license from Markzware
      under U.S. Patent No. 5,963,641.

------------------------------------------------------------

This product includes Python.

      Copyright (c) 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011,
 2012 Python Software Foundation. All Rights Reserved.

      PSF is making Python available to Licensee on an "AS IS"
      basis.  PSF MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR
      IMPLIED.  BY WAY OF EXAMPLE, BUT NOT LIMITATION, PSF MAKES NO AND
      DISCLAIMS ANY REPRESENTATION OR WARRANTY OF MERCHANTABILITY OR FITNESS
      FOR ANY PARTICULAR PURPOSE OR THAT THE USE OF PYTHON WILL NOT
      INFRINGE ANY THIRD PARTY RIGHTS.

      PSF SHALL NOT BE LIABLE TO LICENSEE OR ANY OTHER USERS OF PYTHON
      FOR ANY INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES OR LOSS AS
      A RESULT OF MODIFYING, DISTRIBUTING, OR OTHERWISE USING PYTHON,
      OR ANY DERIVATIVE THEREOF, EVEN IF ADVISED OF THE POSSIBILITY THEREOF.

------------------------------------------------------------

This product includes Qt Script for Applications (QSA).

      Copyright (C) 1992-2007 Trolltech AS. All rights reserved.

      This software is provided AS IS with NO WARRANTY OF ANY KIND, INCLUDING THE
      WARRANTY OF DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

------------------------------------------------------------
```

```
This product includes Qt.

      The software uses Qt, licensed under LGPL v3. The Qt Toolkit is Copyright (C)
 2016 The Qt Company Ltd.

      Portions of this software are copyright (C) 2006-2015 The FreeType Project
 (www.freetype.org). All rights reserved.

      Copyright (C) 1991-2011, Thomas G. Lane, Guido Vollbeding.
      This software is based in part on the work of the Independent JPEG Group.

      Secure Hash Algorithm SHA-3 - brg_endian
      Copyright (c) 1998-2008, Brian Gladman, Worcester, UK. All rights reserved.

      LICENSE TERMS

      The redistribution and use of this software (with or without changes)
      is allowed without the payment of fees or royalties provided that:

       1. source code distributions include the above copyright notice, this
          list of conditions and the following disclaimer;

       2. binary distributions include the above copyright notice, this list
          of conditions and the following disclaimer in their documentation;

       3. the name of the copyright holder is not used to endorse products
          built using this software without specific written permission.

      DISCLAIMER

      This software is provided 'as is' with no explicit or implied warranties
      in respect of its properties, including, but not limited to, correctness
      and/or fitness for purpose.

------------------------------------------------------------

This product includes QtActiveQt.

        Copyright (C) 2015 The Qt Company Ltd.

        Redistribution and use in source and binary forms, with or without
 modification,
        are permitted provided that the following conditions are met: *
 Redistributions of
        source code must retain the above copyright notice, this list of conditions
 and the
        following disclaimer. * Redistributions in binary form must reproduce the
 above
        copyright notice, this list of conditions and the following disclaimer in the
        documentation and/or other materials provided with the distribution. * Neither
 the
        name of The Qt Company Ltd nor the names of its contributors may be used to
 endorse
        or promote products derived from this software without specific prior written
        permission.

        THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS"
 AND ANY
        EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED
 WARRANTIES
        OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO
 EVENT
        SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT,
        INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
 LIMITED
        TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR
 PROFITS; OR
        BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER
 IN
        CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE)
 ARISING IN
        ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF
 SUCH
        DAMAGE.

------------------------------------------------------------
```

```
This product includes QtDeclarative.

      The Qt Toolkit is Copyright (C) 2016 The Qt Company Ltd.

------------------------------------------------------------

This product includes QtScript.

      The Qt Toolkit is Copyright (C) 2015 The Qt Company Ltd.

------------------------------------------------------------

This product includes QtCopyDialog.

      Copyright (c) 2009 Nokia Corporation and/or its subsidiary(-ies).
      All rights reserved.

      BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO
      WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW.
      EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR
      OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY
      KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE
      IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR
      PURPOSE.  THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE
      LIBRARY IS WITH YOU.  SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME
      THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

------------------------------------------------------------

This product includes QtMigration.

        Copyright (C) 2013 Digia Plc and/or its subsidiary(-ies).

        Redistribution and use in source and binary forms, with or without
        modification, are permitted provided that the following conditions are
        met:
          * Redistributions of source code must retain the above copyright
            notice, this list of conditions and the following disclaimer.
          * Redistributions in binary form must reproduce the above copyright
            notice, this list of conditions and the following disclaimer in
            the documentation and/or other materials provided with the
            distribution.
          * Neither the name of Digia Plc and its Subsidiary(-ies) nor the names
            of its contributors may be used to endorse or promote products derived
            from this software without specific prior written permission.

        THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
        "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
        LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
        A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
        OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
        SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
        LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
        DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
        THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
        (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
        OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE."

------------------------------------------------------------

This product includes QtService.

        Copyright (C) 2010 Nokia Corporation and/or its subsidiary(-ies).

        Redistribution and use in source and binary forms, with or without
        modification, are permitted provided that the following conditions are
        met:
          * Redistributions of source code must retain the above copyright
            notice, this list of conditions and the following disclaimer.
          * Redistributions in binary form must reproduce the above copyright
            notice, this list of conditions and the following disclaimer in
            the documentation and/or other materials provided with the
            distribution.
          * Neither the name of Nokia Corporation and its Subsidiary(-ies) nor
            the names of its contributors may be used to endorse or promote
            products derived from this software without specific prior written
```

```
            permission.

        THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
        "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
        LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
        A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
        OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
        SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
        LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
        DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
        THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
        (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
        OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

-------------------------------------------------------------

This product includes QtSingleApplication.

        Copyright (C) 2010 Nokia Corporation and/or its subsidiary(-ies). All rights
 reserved.

        Redistribution and use in source and binary forms, with or without
        modification, are permitted provided that the following conditions are
        met:
          * Redistributions of source code must retain the above copyright
            notice, this list of conditions and the following disclaimer.
          * Redistributions in binary form must reproduce the above copyright
            notice, this list of conditions and the following disclaimer in
            the documentation and/or other materials provided with the
            distribution.
          * Neither the name of Nokia Corporation and its Subsidiary(-ies) nor
            the names of its contributors may be used to endorse or promote
            products derived from this software without specific prior written
            permission.

        THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
        "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
        LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
        A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
        OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
        SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
        LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
        DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
        THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
        (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
        OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.


-------------------------------------------------------------

This product includes Qt SQL driver plugin (qsqlodbc).

      Copyright (C) 1992-2008 Trolltech ASA. All rights reserved.

      Warranty Disclaimer: The Licensed Software is licensed to Licensee
      "as is". To the maximum extent permitted by applicable law, Trolltech on
      behalf of itself and its suppliers, disclaims all warranties and
      conditions, either express or implied, including, but not limited to,
      implied warranties of merchantability, fitness for a particular purpose,
      title and non-infringement with regard to the Licensed Software.

      Limitation of Liability: If, Trolltech's warranty disclaimer
      notwithstanding, Trolltech is held liable to Licensee, whether in
      contract, tort or any other legal theory, based on the Licensed
      Software, Trolltech's entire liability to Licensee and Licensee's
      exclusive remedy shall be, at Trolltech's option, either (A) return of
      the price Licensee paid for the Licensed Software, or (B) repair or
      replacement of the Licensed Software, provided Licensee returns to
      Trolltech all copies of the Licensed Software as originally delivered to
      Licensee. Trolltech shall not under any circumstances be liable to
      Licensee based on failure of the Licensed Software if the failure
      resulted from accident, abuse or misapplication, nor shall Trolltech
      under any circumstances be liable for special damages, punitive or
      exemplary damages, damages for loss of profits or interruption of
      business or for loss or corruption of data. Any award of damages from
      Trolltech to Licensee shall not exceed the total amount Licensee has
      paid to Trolltech in connection with this Agreement.
```

```
------------------------------------------------------------

This product includes QtSql.

      Copyright (c) 2009 Nokia Corporation and/or its subsidiary(-ies).

      BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO
      WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW.
      EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR
      OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY
      KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE
      IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR
      PURPOSE.  THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE
      LIBRARY IS WITH YOU.  SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME
      THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

------------------------------------------------------------

This product includes QtWebEngine.

      The software uses QtWebEngine, licensed under LGPL v3. The Qt Toolkit is
 Copyright (C) 2016 The Qt Company Ltd.

------------------------------------------------------------

This product includes chromium.

        Copyright 2015 The Chromium Authors. All rights reserved.

        Redistribution and use in source and binary forms, with or without
        modification, are permitted provided that the following conditions are
        met:

           * Redistributions of source code must retain the above copyright
        notice, this list of conditions and the following disclaimer.
           * Redistributions in binary form must reproduce the above
        copyright notice, this list of conditions and the following disclaimer
        in the documentation and/or other materials provided with the
        distribution.
           * Neither the name of Google Inc. nor the names of its
        contributors may be used to endorse or promote products derived from
        this software without specific prior written permission.

        THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
        "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT
        LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR
        A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT
        OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL,
        SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT
        LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
        DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
        THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
        (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE
        OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

------------------------------------------------------------

This product includes jQuery CookieBar.

      UNLESS OTHERWISE MUTUALLY AGREED TO BY THE PARTIES IN WRITING, LICENSOR
      OFFERS THE WORK AS-IS AND MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY
      KIND CONCERNING THE WORK, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE,
      INCLUDING, WITHOUT LIMITATION, WARRANTIES OF TITLE, MERCHANTIBILITY,
      FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, OR THE ABSENCE OF
      LATENT OR OTHER DEFECTS, ACCURACY, OR THE PRESENCE OF ABSENCE OF ERRORS,
      WHETHER OR NOT DISCOVERABLE. SOME JURISDICTIONS DO NOT ALLOW THE
      EXCLUSION OF IMPLIED WARRANTIES, SO SUCH EXCLUSION MAY NOT APPLY TO YOU.

      Limitation on Liability.* EXCEPT TO THE EXTENT REQUIRED BY
      APPLICABLE LAW, IN NO EVENT WILL LICENSOR BE LIABLE TO YOU ON ANY LEGAL
      THEORY FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL, PUNITIVE OR EXEMPLARY
      DAMAGES ARISING OUT OF THIS LICENSE OR THE USE OF THE WORK, EVEN IF
      LICENSOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

------------------------------------------------------------
```

This product includes LibTIFF.

Copyright (c) 1988-1997 Sam Leffler
Copyright (c) 1991-1997 Silicon Graphics, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that (i) the above copyright notices and this permission notice appear in all copies of the software and related documentation, and (ii) the names of Sam Leffler and Silicon Graphics may not be used in any advertising or publicity relating to the software without the specific, prior written permission of Sam Leffler and Silicon Graphics.

THE SOFTWARE IS PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL SAM LEFFLER OR SILICON GRAPHICS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER OR NOT ADVISED OF THE POSSIBILITY OF DAMAGE, AND ON ANY THEORY OF LIABILITY, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

This product includes UnRAR.

Copyright (c) 1993 Alexander Roshal

THE RAR ARCHIVER AND THE UNRAR UTILITY ARE DISTRIBUTED "AS IS". NO WARRANTY OF ANY KIND IS EXPRESSED OR IMPLIED. YOU USE AT YOUR OWN RISK. THE AUTHOR WILL NOT BE LIABLE FOR DATA LOSS, DAMAGES, LOSS OF PROFITS OR ANY OTHER KIND OF LOSS WHILE USING OR MISUSING THIS SOFTWARE.

This product includes XMP Toolkit.

Copyright (c) 1999 - 2010, Adobe Systems Incorporated
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
* Neither the name of Adobe Systems Incorporated, nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

This product includes XOSL.

Copyright (c) 2003 Satimage. All rights reserved.
Copyright (c) 2000-2002 by Apple Computer, Inc., All Rights Reserved.
Copyright 2005 Jean-Baptiste LE STANG. All rights reserved.

The Apple Software is provided by Apple on an "AS IS" basis. APPLE MAKES NO

```
      WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED
      WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR
      PURPOSE, REGARDING THE APPLE SOFTWARE OR ITS USE AND OPERATION ALONE OR IN
      COMBINATION WITH YOUR PRODUCTS.

      IN NO EVENT SHALL APPLE BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR
      CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE
      GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION)
      ARISING IN ANY WAY OUT OF THE USE, REPRODUCTION, MODIFICATION AND/OR
 DISTRIBUTION
      OF THE APPLE SOFTWARE, HOWEVER CAUSED AND WHETHER UNDER THEORY OF CONTRACT, TORT
      (INCLUDING NEGLIGENCE), STRICT LIABILITY OR OTHERWISE, EVEN IF APPLE HAS BEEN
      ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

-------------------------------------------------------------

This product includes zlib.

      Copyright (C) 1995-2004 Jean-loup Gailly and Mark Adler

      This software is provided 'as-is', without any express or implied
      warranty.  In no event will the authors be held liable for any damages
      arising from the use of this software.

-------------------------------------------------------------
```