

SCANSYS

Image**Capture**

ImageCapture 8.18

DOCUMENTATION

© SCAN SYS B.V.

FEBRUARY 2, 2021

Changes in this Document

Below is a timeline of the most important changes in this documentation.

Most changes include the ticket number referring to our internal ticket system. You can mention this number when you request more information at Scan Sys, so that the employee can find the information quickly.

February 12, 2019: Information in Section 7.2 extended with the end date of the support for SQL Server 2008 and 2008 R2 (#11274).

February 7, 2019: New Chapter 1 about configuring templates added (#9406).

September 3, 2018: Step added to Section 8.5.2 for disabling automatic recycling of the *Application Pool* in IIS (#10841).

September 7, 2017: Security aspects of Web Client in Section 8.5.4 extended with information about *Password Field* (#10164).

July 27, 2017: Web Client browser support updated in Section 7.2 (#10139).

May 26, 2016: New Chapter 2 about the Client for end users added (#8029).

May 3, 2016: Information in Chapter 10 extended with an explanation of the processing order in the Client Service (#7524).

March 24, 2016: Requirements in Section 7.2 extended with information on the required IIS components (#6547).

February 24, 2016: Requirements in Section 7.2 extended with information on the usage of Microsoft SQL Server Express (#7604).

December 8, 2015: Requirements in Section 7.2 extended with necessary configuration for correct operation of the OCR engine (#6885).

December 1, 2015: New Chapter 10 about the Client Service added and requirements updated in Chapter 7 (#6461).

September 9, 2015: Initial version.

Preface

This document includes all public *ImageCapture Documentation* that is currently available in English. This is specifically not intended to be viewed as a comprehensive 'User Manual' that describes each setting in detail; it should be viewed as general documentation divided into the following complementary parts:

I Product Specialist

II End User

A brief reference for the end user.

III Application Manager

All the information required to carry out the role of application manager, e.g. all requirements concerning installation, database management, licenses, etc.

Please let us know if you have a suggestion for the addition, deletion or modification of this documentation to help us improve it. We are particularly interested in feedback from partners, application managers and end users so that we can understand what is good about the documentation and how things can be better described.

Scan Sys B.V. <info@scansys.nl>

February 2, 2021

This documentation describes ImageCapture 8.18 and is dated February 2, 2021. Separate PDFs are available for reading on screen or for double-sided printing. The latest versions are available through our *Partner Portal*: <http://www.scansys.eu>

Contents

Changes in this Document	i
Preface	ii
I Product Specialist	1
1 Templates	2
1.1 Creating	2
1.2 Configuring	2
1.3 Testing	9
1.4 Put into use	10
1.5 Regular expressions	10
II End User	12
2 Client	13
2.1 Navigation within ImageCapture	13
2.2 Synchronizing online data	16
3 Documents screen	18
3.1 Status	20
4 Importing (Import Job)	21
4.1 Receiving documents	22
4.2 Preparing documents	22
4.3 Scanning	22
4.4 Importing	22
4.5 Processing documents	23
5 Verifying (Index Job)	24
6 Linking data (Extended Index Job)	28
III Application Manager	30
7 Requirements	31

7.1	Infrastructure	31
7.2	Systems	32
7.3	Permissions and management	34
7.4	Interfaces to external applications	38
8	New Installation	39
8.1	SQL Server	39
8.2	License Service	39
8.3	ImageCapture	40
8.4	Client Service	43
8.5	Web Client	44
8.6	Silent installation	47
8.7	Virtualisation	48
8.8	Miscellaneous	48
9	Updating Current Installation	49
9.1	ImageCapture	49
10	Client Service	55
10.1	Components	55
10.2	Sessions	58
IV	Appendices	59
	About this Document	60

Part I

Product Specialist

Chapter 1

Templates

Subjects in this chapter:

- Configuring templates
- Regular expressions

ImageCapture will, in many cases, recognize data from an invoice completely automatically. If this is not the case, for example when the invoice does not have a “tidy” layout, templates can be used to improve recognition. In this chapter the various options are explained.

1.1 Creating

In Section 5 you will find an explanation of how a template can be created from the Client. In this case, the selected relation is linked to the template. It is also possible to create a template in the Manager. In this case, the relation belonging to this template needs to be chosen in a pop-up screen and the associated invoice needs to be imported manually. In both cases it is important that the invoice used is typical of all invoices that are to be processed using this template. This is especially important if templates are to be used to distinguish different invoice layouts for the same relation.

1.2 Configuring

Template configuration can only be done using the ImageCapture Manager. It can be done by Admin users via the relevant class on the *Classes* tab, but only when no users are active in this class in the Client. Both Admin users and Template users can configure templates using the *Templates* tab. In this case, other users can continue to work in the Client.

On the *Templates* tab you first of all select the class for which you want to configure templates. You will then be shown the list of existing templates. Each template has an icon that shows what the status of the template is:

New The template is newly created, but not yet configured.

Complete The template has been fully configured in the Manager.

Modify The template is already fully configured, but a user has indicated that something needs to be amended.

Inactive The template has been set to inactive, for example because it is only partially configured and in this stage will make recognition worse.

When you select a template, you are shown the invoice which was used to create it. Directly below the name the status is displayed and you can change it, for example, when you have finished configuring and want to change the status from New to Complete. When a message has been entered by a user for this template, it will be displayed in the yellow bar above the invoice.

To the right of the invoice you have the option to continue configuring the template. The following paragraphs describe the different options.

1.2.1 Identification

ImageCapture normally automatically identifies which relation the invoice belongs to, based on the data in the underlying administration. If this automatic recognition does not work, then that link can also be created on the basis of other values present on the invoice.

In addition, the identification settings can be used to distinguish between different invoice layouts for the same relation. This differentiation needs to be made using a unique value for each layout.

Configuring the identification is done on the *Identification* tab. The following identification methods are available:

Checksum This relates to values that can be validated, such as an IBAN, which includes a control digit.

Field This is used if the relation (code) is already stored in a field, for example when importing the invoice metadata from an XML file.

Numeric This relates to numeric values with no further validation. Take into account that the selected value must be unique to this relation. So be careful about using small numbers, because the PO Box number for a relation could also exist as part of the phone number of another relation.

String This relates to one or more text values. Using the *Retain identifier order* option, you can define that the values must occur in the sequence given. Set this option, for example, when you use the content of an address block (street, postal code and city) as values.

The values for the various identification methods can, just like fields in the Client, be read by drawing a frame around them using the mouse while pressing the Shift key. For string identifications, several lines can be read at the same time.

Using the *Match* option under the list of identification methods you can define whether the template should be linked if at least one of the methods results in a match or only if all of them do.

Use *All*, for example, if you want to distinguish different invoice layouts. For each template you can then use the same bank account number for this relation and then define a unique text value for each template. A document is then only linked to a template if both the bank account number and the unique value are found.

Any can be used, for example, if a relation sometimes shows one bank account number and sometimes another on their invoices. You can provide both values as Checksum values and the

document will be linked to the template if (at least) one of the values occurs.

1.2.2 Improving reading field values

Using the *Fields* tab, the settings of one or more fields can be changed. These changes then only apply to documents that are linked to this template. For example, reading an invoice number can be corrected, if the automatic recognition does not do it properly, by dragging a zone where this value should be searched for and/or adding a different keyword.

Zones

On the *Fields* tab in the top right of the screen all present Smart Fields are shown. Keep *Display all Field types* disabled for this. After selecting a field in the list it is possible to draw one or more zones for that field using the *Field zone* button in the button bar above the invoice. This ensures that values will only be read if they are partially or fully inside that zone. For each zone you can define to which pages it applies. The zones for the currently selected field, which are shown in blue, show this value in the top left of the zone. This can be changed by first choosing the mouse arrow button from the button bar, selecting the zone using a right mouse click and then choosing *Pages/Order/Group/Anchor*. See Table 1.1 for some examples of how to configure these pages.

Table 1.1: Configure pages to be used

Setting	Pages used
1,3,5	Pages 1, 3 and 5
1,n	Page 1 and the last page
1,4-n	Page 1 and page 4 up to and including the last page
*	All pages
*,-n	All pages except the last one
n-1	Only the second-last page

For fields where the values are found using keywords, such as invoice number (*Invoice Number Smart Field*), the size of the zone will affect the behavior. Initially searching is done by keyword. If no value is found this way, the full OCR value of the zone is used as the value. This is only done, however, if the zone is small enough. If the zone is too large to be able to fall back on the full OCR value then its outline will turn red.

To avoid the zones being read out incorrectly, for example when it varies how high the invoice is printed on the page, it is advisable to create extra zones using the *Alignment zone* button. This type of zone helps to make sure that an invoice is correctly repositioned, if necessary, before values are extracted. This is necessary mainly for invoices that at some point in the process have been scanned. Invoices that are received digitally usually come directly from a financial system and then often have identical positioning.

When using alignment zones, 3 or 4 zones need to be drawn around characters or symbols in the invoice layout, which are the same for every invoice. They need to be pieces of data that are not pre-printed on the form that is used, but that are printed at the same time as the invoice data, and therefore move the same distance as the data. For best results, do not make

these zones too large. The best result is achieved by picking a short word, or even just a few letters, so long as the value that is used does not occur several times close to each other. If this is not the case, then a message is displayed and a different zone needs to be selected.

Settings

When selecting a field from the list of fields in the top right of the screen, all the settings for that field are shown below the list. These settings are organized into a number of groups that depend on the field type. By default, the checkbox *Use defaults* is enabled for each group. This means that the settings at class level are applied. If this checkbox is disabled, the settings below can be changed so that the field behaves differently just for this template. The following groups may be present:

General These are general settings, such as the default value that the field should get for documents linked to this template.

Smart Search/Additional Here settings for extracting values can be adjusted. This group is explained in more detail below.

Validation Here different validation settings can be entered. These are not used to read values, but are only used when verifying.

Interactive/Zonal OCR These settings are used if the full OCR of the zone is read, or if interactive OCR is used during verifying in order to read the value at that stage. For example, you can set the language here so that characters of non-Western languages can be read.

The most commonly used options in the *Smart Search* group are the following:

Read value This determines whether the field is to be read automatically or not.

Custom keyword Use this to enter a different keyword. When a relation prints the invoice number as “Purchase number: 12345” you can enter the term “Purchase number” here in order to read the value 12345. The colon does not need to be entered. Other separator symbols, like a period after an abbreviation do need to be entered.

Only search under keyword Use this option, for example, if the invoice number is printed below the word “Invoice number” and a value that is to the right of the word “Invoice number” is being read instead.

Use Regex filter Use this option to only use the values that are found if they match a defined format. See Section 1.5 for more information about regular expressions.

Line recognition

Often invoices include data in the form of lines or rows. For example, a list of individual ordered items or number plates on a lease invoice. To read these lines, a number of specific field types can be used. Configuring this is more complex than extracting header fields, especially if more than two columns need to be read out. In such cases, it is best to first attend a template training course by Scan Sys.

The following field types are used for line recognition:

Amount Line Field This field is used for amounts and is named `rAmount`, for example.

Text Line Field (character) This field is used for text values, such as item numbers and is named `rItemCode`, for example.

Text Line Field (memo) This field is used for text values existing of multiple lines, such as descriptions and is named `rDescription`, for example.

For the fields that are used for line recognition, the option *Read value* is normally disabled at class level. Reading these fields can then be enabled and configured per creditor in the corresponding template.

The following principles are important when using line recognition:

- Values to be read in different columns may not overlap vertically, see Figure 1.1.
- There is always at least one field, which is leading for the creation of lines. Every value that is read for this field results in one line. If a value for this field is not read, then a line will be missing in the result. If there are several leading fields, the values to be read must always be on the same line, otherwise empty values will be inserted. If there are two leading fields, 2 lines will be created in the case of Figure 1.2, whereas 4 lines will be created in the case of Figure 1.3. Any non-leading fields are referred to in ImageCapture as *body fields* and always follow the leading fields. This prevents extra lines being created, for example, for sub-totals.

Item code 1	Amount 1
	Amount 2
Item code 2	

Figure 1.1: Values that overlap vertically cannot be read

Item code 1	Amount 1
Item code 2	Amount 2

Figure 1.2: Correct alignment when using 2 leading fields

Item code 1	Amount 1
Item code 2	Amount 2

Figure 1.3: Incorrect alignment when using 2 leading fields

In Figure 1.4 the item code is the field for which each value found should result in exactly one line being created. To do this disable the option *Use defaults* and enable the option *Read value*. Also make sure the option *Is body Field* is disabled so that this is the leading field. It should now be determined how values are to be found for this field. In this case, a regular expression is entered that determines that the values must start with PA or CON-, followed by 1 or more digits, a dash and 4 characters of any kind. See Section 1.5 for more information about regular expressions. In some cases it is now necessary to draw a zone to define where the values are to be found. In this case we are talking about such a specific regular expression, that the values cannot be read from the wrong place, so no zone is needed.

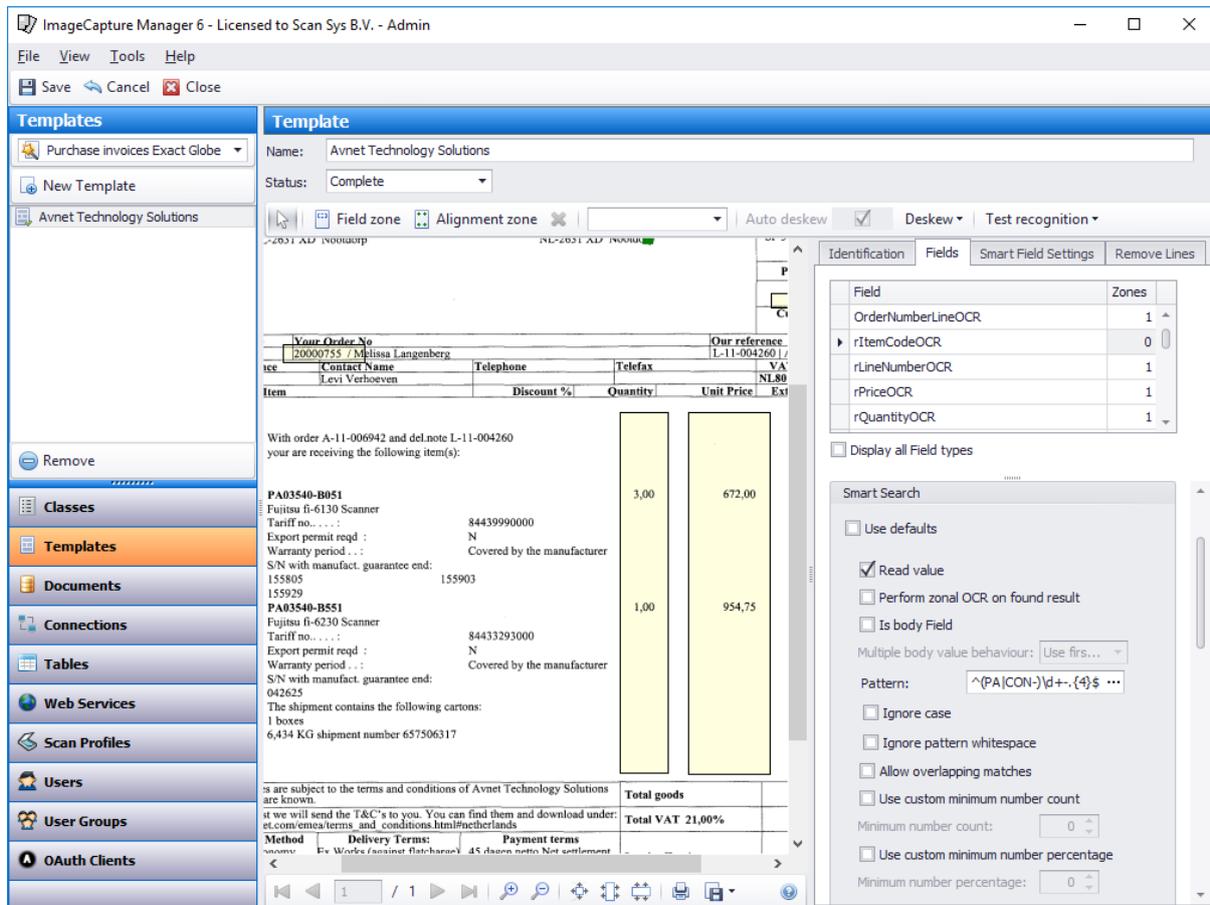


Figure 1.4: Template configuration

For each item code found, the quantity and the price per unit need to be read. To do this, disable the option *Use defaults* and enable the options *Read value* and *Is body Field*. For *Multiple body value behavior* select *Use first value*.

The `rQuantityOcr` field needs to be configured further. First a regular expression needs to be entered. In this case we are looking for numeric values, with or without decimals. Because this is a very general regular expression, you also need to draw a zone in which these values are searched.

Finally, the `rPriceOcr` field needs to be configured. Because this is an *Amount Line Field* it will automatically search for amounts and no regular expression needs to be entered. Because there are multiple columns with amounts, a zone also needs to be drawn for this field.

When configuring body fields, *Multiple body value behavior* can be used to determine what happens if for a value of a leading field multiple values are found for the current field, as in Figure 1.5. The following settings are available:



Figure 1.5: Multiple body values per leading value

Use first value The first value is used.

Use last value The last value is used.

Use all values All values are used. For the second value to the last value an empty value is inserted for the leading field.

Use all values, except the last one All values are used, except the final one. This can be useful if the last value always is a sum of the values above. For the second value to the last value an empty value is inserted for the leading field.

Concatenate multi-line Merge all values with line breaks between each. This option can only be used for a *Text Line Field (memo)*.

Concatenate single-line Merge all values with spaces between each.

For line fields, the *Smart Search* section has the option *Allow overlapping matches* which influences the search behavior. When three digit values are searched, for example, and the invoice contains the value 1234, then only the value 123 will be found when this option is disabled. When this option is enabled, then both 123 and 234 will be found as values.

1.2.3 Other settings

On the *Smart Field Settings* tab a number of extra options can be configured:

Use default OCR pages / OCR pages These options determine which pages are used for extracting field values. If the first option is enabled, then the value at the class level is used. With *OCR pages* you can define a list of comma-separated values, based, for example, on page numbers or range. See Table 1.1 for several examples.

Use dynamic language If this option is enabled, then the language to be used is defined based on the country of the creditor or debtor in the underlying financial application. This option only works if this function is correctly configured within the class. By disabling this, you can force the use of a specific language, for example for a German creditor who issues invoices in English.

Use default languages If this option is enabled, then the languages configured at class level are used. By disabling this, you can select different languages in the list below for the current template.

Use default VAT categories If this option is enabled, then the VAT percentages configured at class level are used. By disabling this, you can select different percentages in the list below for the current template.

On the *Remove lines* tab the removal of lines can be configured. The lines are only removed temporarily while extracting data. The document will not be permanently changed by this. This can be particularly useful for invoices where information is printed in a grid. In that case lines can disrupt recognition, for example because a section of a line is read as a 1 or if a keyword and its value are printed in separate cells. All values, except for *Max wall percent*, are defined in pixels.

1.3 Testing

Settings can be tested during or after configuring a template. This can be done using the invoice used to create the template or using files that are to be imported. You can do this by selecting *On Template...* or *On files...* respectively in the *Test Recognition* menu. This starts the same recognition process as in the Client.

Please note: when using *Test Recognition* → *On Template...* the result may differ from the results of processing a document in the Client. There are two possible causes for this:

- The invoice from a template is always stored as a black and white image. This may affect the recognition of text, for example, when text was originally on a colored background.
- The template does not keep the PDF text from the original invoice. This causes OCR to be performed, which can give a different result to when using files containing PDF text.

On the *Test results* tab the result of the recognition process can be seen. The following information is displayed under *Identification Job results*:

Used pages The pages used for identification.

Matched Identification The name of the relation that was found during the identification process.

Matched Template The template that is found for the invoice that was tested. If this value is empty, it means that the identification settings of the template did not yield any results for the invoice used. In that case the settings for the current template are not applied to this invoice.

Found checksum values All “validatable” values that were found on the invoice and that can be used for identification, such as bank account and VAT numbers.

Under the heading *Data Extraction Job results* any fields that have been extracted can be seen and with which value(s). This is subdivided into header and line fields.

On the *Raw text* tab the text data that was used for recognition can be seen. For each page the source from which the data came is shown under *Source*. When existing text from a PDF is used it says *Pdf* here and when text was read from the image using OCR it will say *Ocr*.

At the top of the screen with test results, you have the option of selecting a template manually and performing a test on it. This will skip the identification and show the results that the invoice from the current template would yield if it were tested using the selected template. This can be useful when a user has created a new template for a creditor for whom a template already existed. You can then check whether the new template will yield the correct results. If that is the case, you can then adjust the identification settings of the existing template so that the new invoice is also matched with it. In that case you can delete the new template.

1.4 Put into use

Once you have completed the configuration of the template you can indicate this by setting its status to *Complete* and choosing *Save*.

1.5 Regular expressions

In a number of places in ImageCapture you can use a regular expression (short name: regex), for example as a filter. This can be used to control recognition, for example by stating that only values of 8 digits may be used. Regular expressions offer so many possibilities, it is almost a programming language in its own right. The documentation in this regard limits itself to a few examples. The internet provides a wide range of sources that describe regular expressions in more detail.

1.5.1 Example 1: Order numbers

If an order number has to be found that starts with the letters *ORD* followed by 5, 6 or 7 digits, then the following regex can be used: `^ORD\d{5,7}$`. This regex includes the following components:

- The caret (`^`) states that the start of a value must be matched. Therefore the value *WOORD12345* would not be used, because there are characters before *ORD*.
- The text *ORD* indicates this text must appear literally.
- The notation `\d{5,7}` indicates there must be a minimum of 5 and a maximum of 7 digits present. `\d` here stands for digits and the number of times this kind of character must appear is specified between curly brackets (`{}`).
- The dollar sign (`$`) states that the end of a value must be matched. Therefore the value *ORD12345678* would not be used, because it contains one extra digit.

1.5.2 Example 2: License plates

To read out Dutch license plates, the composition of which has changed a few times in recent years, the following regex can be used:

```
\d{1}-[A-Z]{3}-\d{2}|\d{2}-[A-Z]{3}-\d{1}|\d{2}-[A-Z]{2}-[A-Z]{2}|
[A-Z]{2}-[A-Z]{2}-\d{2}|[A-Z]{2}-\d{3}-[A-Z]{1}
```

This regex actually contains five separate regexes, that are combined using the pipe symbol (`|`), so that a value must match one of those regexes. This regex is based on the use of minus signs (`-`) as hyphen and of capital letters. The following combinations can then be recognized:

- 0-AAA-00
- 00-AAA-0
- 00-AA-AA
- AA-AA-00
- AA-000-A

In this case each regex consists of combinations of a number of digits, such as `\d{1}` for one digit, and a number of capital letters, such as `[A-Z]{3}` for three capital letters, with a hyphen (`-`) between them.

1.5.3 Example 3: Item codes

The pipe symbol from the previous example also needs to be used if, for example, the following values need to be recognized:

- ART-123456-001
- ART-123456-01
- ART-123456-1
- ART-123456
- COD-123456-001
- COD-123456-01
- COD-123456-1
- COD-123456

The corresponding regex then is `^(ART/COD)-\d{6}(-\d{1,3})?$. This regex includes the following components:`

- The `^(ART/COD)` part makes sure that the value must start with either `ART` or `COD`.
- The `-\d{6}` part makes sure there is a hyphen plus 6 digits next.
- By enclosing part `-\d{1,3}` with parentheses followed by a question mark makes sure that optionally a hyphen and 1, 2 or 3 digits may follow.
- The dollar sign makes sure that nothing else may follow the value.

Part II
End User

Chapter 2

Client

This chapter gives a general description of the workflow in ImageCapture for end users. Since ImageCapture is a dynamic application in which a great many functions can be enabled or disabled, functionality not available in your configuration may possibly be explained here. For significant deviations a separate document with specific instructions will be supplied. Furthermore, in ImageCapture all buttons are provided with so-called *tool tips*, which are shown when you hover the mouse arrow above them. These tool tips contain a description of the functionality of the button and, if applicable, the hot key with which this function can be invoked using the keyboard.

2.1 Navigation within ImageCapture

- Launch ImageCapture 8.18 Client using the shortcut in the Start Menu or on the Desktop.
- When you are not using Windows Authentication you will enter the login screen, where you have to enter your ImageCapture user name and password. In some cases a third field will appear, where a license group has to be chosen, see Figure 2.1.
- After logging in you enter the Classes screen, see Figure 2.2. In this screen you will find all classes — document streams — available to you. If there are already documents present in a class this is indicated by colored bars, like at the bottom of the *Purchase invoices with ImageCapture IIR* block. A class can be opened by double-clicking it or by selecting the correct class and clicking the *Open class* button in the menu bar. When you wish to add new documents to a class, you should choose the right class for the type of documents, possibly relying on the descriptions below the class names.
- When you have opened a class, you will see three columns, see Figure 2.3:
 - Jobs: In this list you will find all jobs you can process. Some of these jobs need user input, like importing, scanning or verifying. Other jobs do not need user input and are grouped under the headings *Unattended jobs*. Each job containing documents to be processed will indicate this by colored numbers, as seen in the *Verifying* job. A job can be started by double-clicking it or by selecting the correct job and clicking *Process* in the menu bar.
 - Filters: Here you can filter the documents by all sorts of properties, like branch, administration or creditor.

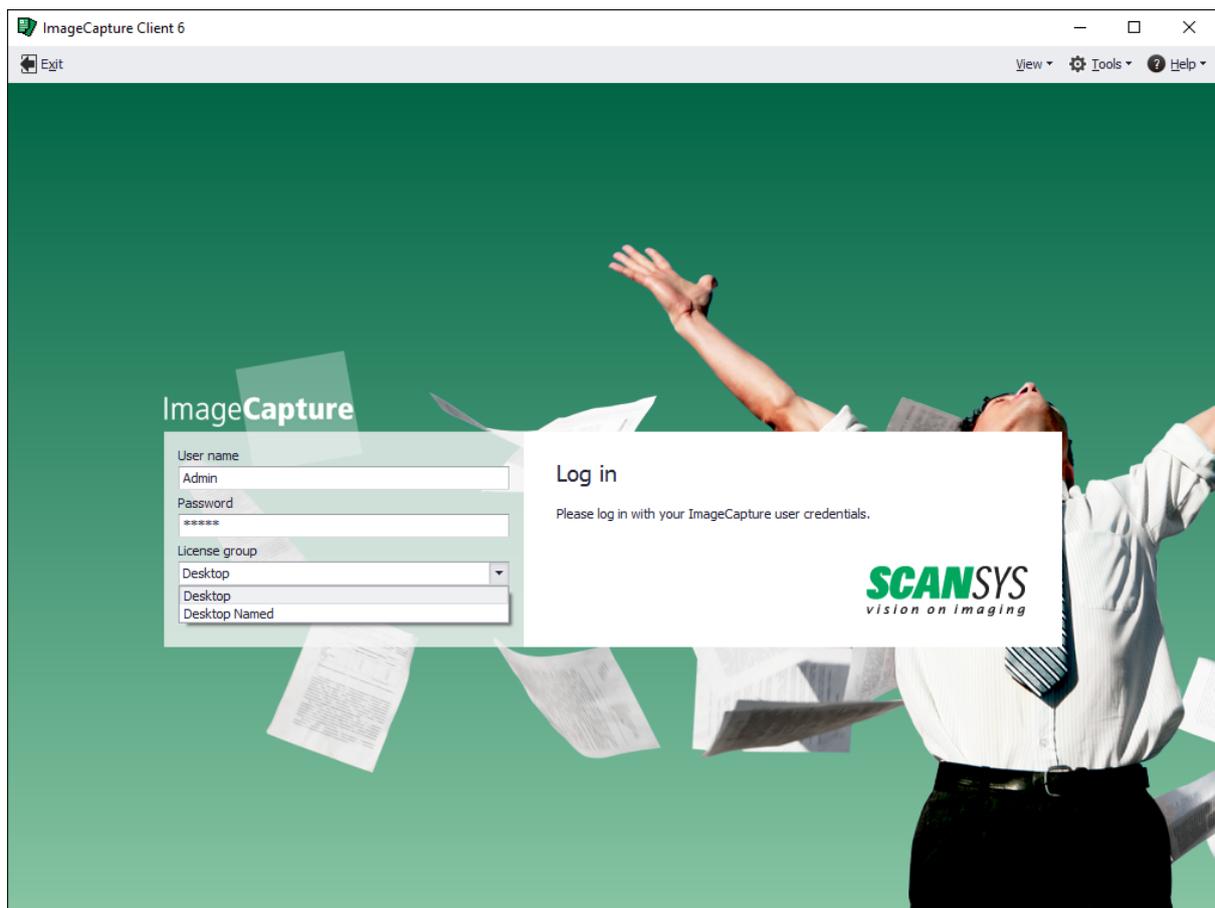


Figure 2.1: Logging in

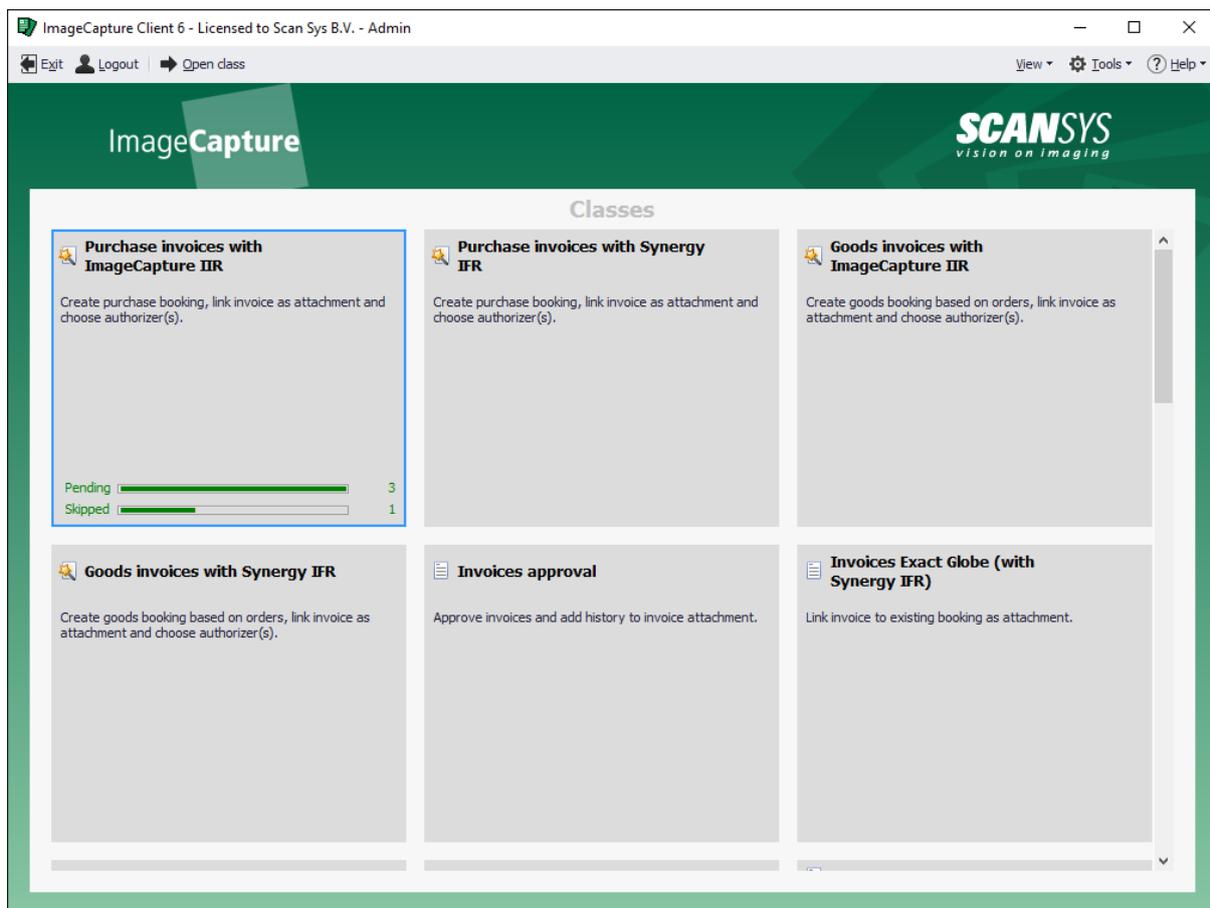


Figure 2.2: Classes

- Documents: This column contains information about the number of documents in the current class, which you may see and/or process, divided by status. These numbers depend on the filter chosen in the middle column.

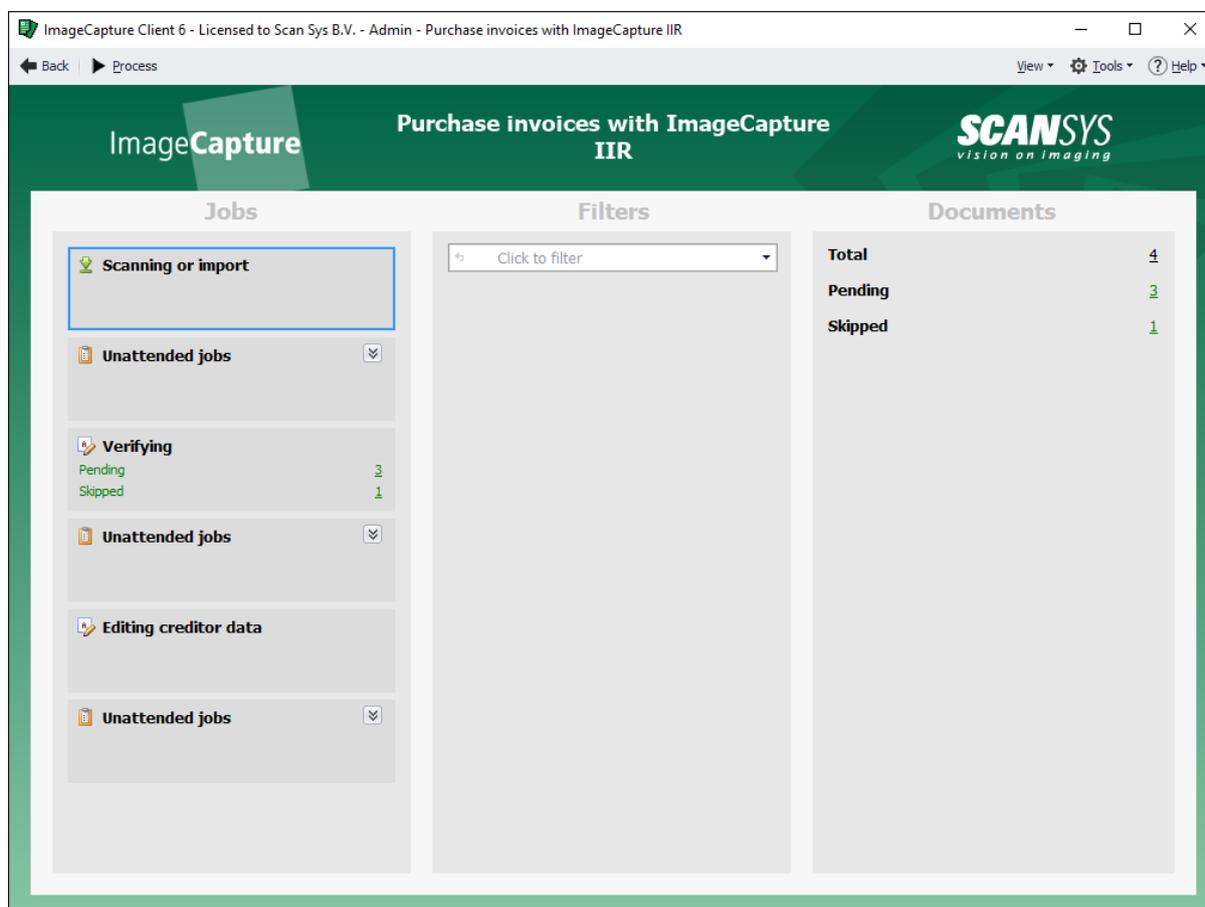


Figure 2.3: Jobs

By clicking the underlined counters in the Jobs and Documents columns you will open the Documents screen. Here you can view images and other information from these documents. When you open the Documents screen using the number after *Total* you will see all documents available to you. When you do this using the number after the text *Pending* in a specific job, then you will only see the documents ready for that specific job. You can find more information on the Documents screen in its paragraph below.

2.2 Synchronizing online data

ImageCapture contains a number of connections to online applications, where the data from the online application is synchronized to the ImageCapture database. This local data is then shown in several jobs. Most of these configurations contain background tasks that perform the synchronization, keeping the local data up to date. Sometimes this synchronization lags behind somewhat, for example when you have just created a creditor in the online application and no background task has run since. During *Verifying*, for instance, you will then notice that the particular creditor is missing in the list of creditors. In that case you can perform the synchronization manually if your application manager allows it. To do this, perform the following steps:

- Stop the process using the *Stop* button.
- Open the *Tools* → *(name of online application) credentials* menu.
- Choose the account and, if applicable for the online application chosen, the administration(s) for which you wish to synchronize data.
- Click the *Retrieve* button. You will now see a screen like in Figure 2.4.
- You now see the different types of data that can be synchronized and when these have been synchronized last for the selected administration(s). Here choose one or more types of data you wish to synchronize and click *OK*. Keep in mind that this synchronization may take a long time when you choose many administrations and/or types of data.
- Close the *credentials* screen.
- Start the process again where you left off. The particular list now contains the newly synchronized data.

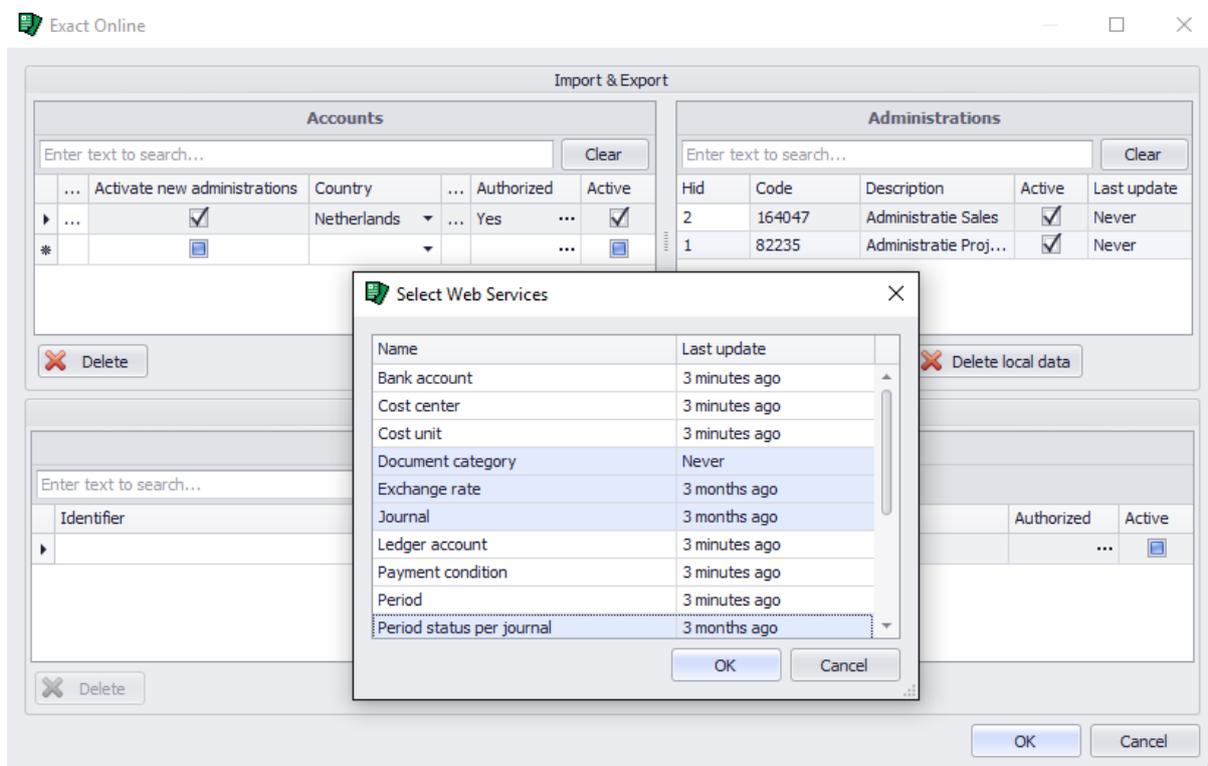


Figure 2.4: Synchronizing online data

Chapter 3

Documents screen

This screen contains a view of all documents visible to you, see Figure 3.1. In it, all data relevant to these documents can be viewed and a number of actions can be performed on these documents. These are the actions using the buttons in the menu bar and changing the priority. Other adjustments, like changing fields values or the images of the document are not possible in this screen and can only be made within the normal process.

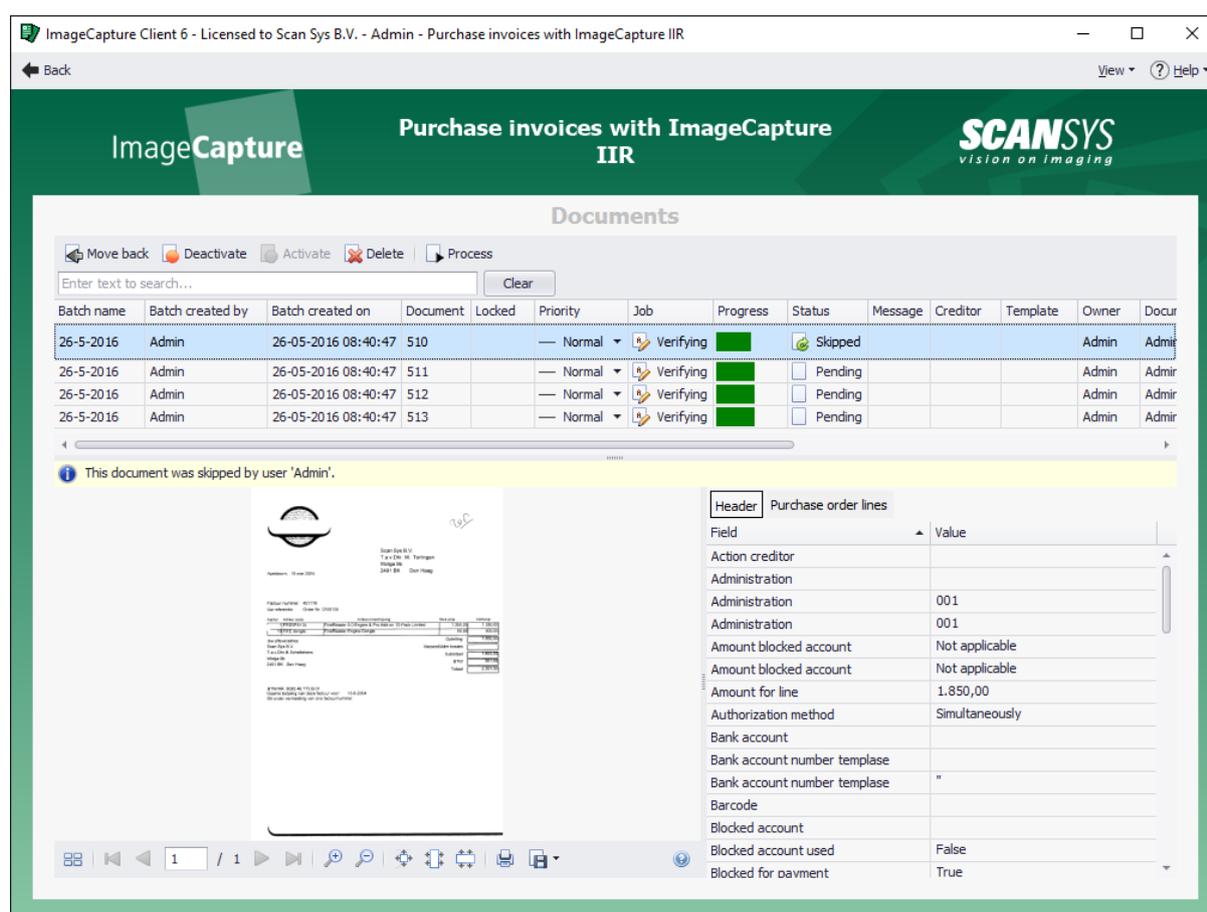


Figure 3.1: Documents screen

In the top section all documents are listed vertically. In this list a number of properties of the document are shown, like creation date, user and status. The columns shown can be adjusted

using the *View* → *Select columns* menu in the top right of the screen. The list can be filtered by entering a value in the text field directly above the list. Only documents where this value occurs in at least one column will then be shown.

In the list of documents it is also possible to change the priority of a document. This priority determines the sequence in which the documents are processed and takes precedence over the normal processing order, namely the order in which the documents were created. This allows you, for instance, to set the priority to *Low* for an invoice for which the corresponding goods have not yet been delivered. You will then be presented this invoice last, so that you will not have to skip it using *Skip* or *Skip again* in order to process the other documents. Conversely, you can set the priority to *High* to have an invoice processed with urgency. This is usually only necessary in environments where large amounts of invoices are processed.

When one document is selected in the list, the preview and all field values of that document are shown in the bottom section of the screen. The preview also offers the ability to directly print the image(s) or save them as TIFF or PDF file.

The tool bar above the list of documents contains a number of functions. Depending on your configuration they may not all be available:

3.0.1 Move back

In order to process a document it is sometimes necessary to move it back one or more steps in the process, for example because an error occurred in processing, which has been solved in the meantime. To do this select the particular document and then click the *Move back* button. Select the step to which the document should be moved in the opened dialog.

Note: depending on the step to which the document is moved back, previously filled fields may be expunged and should be coded again.

3.0.2 Deactivate and Activate

It can occur that a document has actually been imported into ImageCapture, but cannot yet be entered into or processed in the workflow, for instance because it is an invoice that may not yet be entered into the accounts. In that case it is possible to deactivate such a document. By doing so, the document remains in the ImageCapture database, yet is not shown in the process. As soon as the document may be processed again you can activate the document with the *Activate* button in order to include it again in the process.

3.0.3 Delete

In some cases there may be a document in ImageCapture, which should not be processed further. This can occur when for example it turns out an invoice has already been entered previously. In that case you can remove the document from ImageCapture using the *Delete* button.

Note: this action is irreversible!

3.0.4 Process

When you wish to process one or more documents immediately, without having to process any other documents first, you can select these documents and click the *Process* button. Now you immediately start processing the selected documents. The documents should however be pending in a job you are allowed to process. This can for instance be useful when you wish to immediately process a supplier's invoice that arrived later. You can then locate this one document using ImageCapture's filtering abilities and process it immediately.

3.1 Status

The current status of each document is displayed in the *Status* column. In it the following values can occur:

Imported Files have been moved from an external source to the database, e.g. uploaded via the Web Client or imported from an e-mail. No pages have been created yet.

Preprocessed Pages have been created from source files and necessary actions have been performed. Examples of these actions are automatic rotation or barcode recognition for separation purposes.

Pending The document is queued for processing in the job shown in the *Job* column.

Waiting An automatic step could not yet be completed, for example because a file exchange with an external application has not been completed. The Client Service will retry processing the document when at least 5 minutes have passed since the last attempt.

Skipped The document has been skipped by a user and will be presented in the process again next time.

Moved back The document has been moved back to a previous step by a user and will be presented there again in the process.

Unattended failed An automatic step could not be completed and should now be performed manually.

Errored An error has occurred in an automatic step. According to the message shown in the *Message* column it can be determined how this error should be solved.

Deactivated The document has been deactivated by a user and will only be presented again in the process after it has been manually activated again.

Finished The document does not need further processing. A document can have this status for one of two reasons. Either the document has prematurely stopped in the process, e.g. because it has been split into new documents or has been merged with other existing documents. Or it has been processed completely and may be deleted manually. If necessary, the option to automatically delete these documents in both cases can be set in the Manager.

Chapter 4

Importing (Import Job)

To be able to add new documents to a class you need to scan or import them. This usually is the first job in the list under *Jobs*. When you start this job you will see the Figure 4.1 screen. In the top of the screen you can choose the source you wish to use. Depending on the source, more buttons will become available.

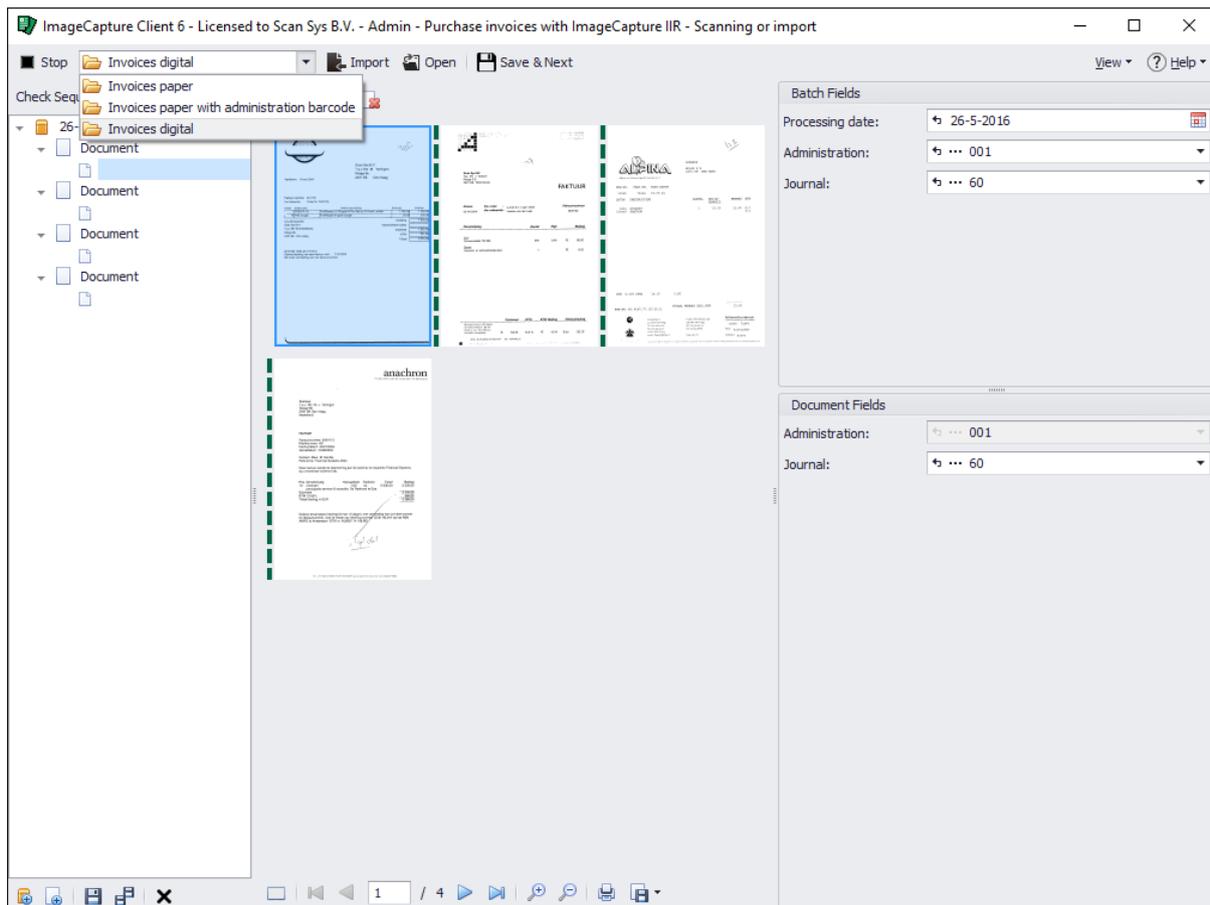


Figure 4.1: Scanning or importing

4.1 Receiving documents

Documents can enter your organization in different ways. For each there are different ways to put them into ImageCapture.

4.1.1 Paper documents

Documents received on paper will always have to be scanned. This can be done directly from ImageCapture, but also with a multifunctional (MFP) or network scanner.

4.1.2 Digital documents

Documents can be received digitally in various ways:

- Via email. Depending on the configuration, these documents can be imported directly from the mailbox or should be saved in a specific location on the network or local system.
- From an online environment, like a customer or user portal. Direct import is possible from supported environments. From other environments documents should be downloaded manually and saved in a specific location on the network or local system.

4.2 Preparing documents

Depending on your configuration, incoming documents usually have to be grouped by administration, department and/or type (purchase / sales invoices). With paper documents this means making separate piles, with digital documents this means saving each document in the correct location.

With paper documents it is in some cases necessary to mark the document separation in advance using barcode stickers or sheets.

4.3 Scanning

When you choose a scanner as source, a second list will appear, where you can choose the scan profile. After choosing a scan profile, wait for the scanner to finish initializing and the *Scan* button to appear. Then press *Scan* to scan the documents. Changing the scanner settings can be done by pressing the *Scan Settings* button. This can be used when certain settings should be used for a specific document. Enable the option *Duplex* to scan double-sided, for instance, or change *bit depth* to scan in color. Here you can also set the contrast value or select a different paper format.

4.4 Importing

Press *Import* to import all available documents from this source's predefined import location. With some sources an *Open* button is also available. You can use this to import one or more specific documents from the import location or a custom location.

4.5 Processing documents

The documents are inserted into one or more *batches* during the scan or import process, depending on the configuration. A batch contains one or more documents. A document contains one or more pages. All batches, pages and documents are visible in the left part of the screen. In the middle of the screen all documents in the first batch are shown. A vertical dotted line indicates the separation between documents. When this separation is not right it can be corrected utilizing the *Split* and *Combine* buttons to split or combine documents respectively. It is also possible to drag and drop pages between documents and batches. Especially when scanning, check the quality and completeness of the pages. Depending on the configuration, there may be additional functions available to adjust pages, for example rotating or changing the size.

Note: check the document separation well, because this cannot be changed further on in the process.

During scanning or importing, field values are also assigned to batches and documents. When these are not filled completely or not correctly, the documents or batches are displayed in red and these values should be filled in manually at the right side of the screen.

Note: Field values shown under *Batch Fields* apply to all documents in the current batch. This means that when changing such a value, it is changed for all documents in that batch, also when only a single document is selected. For instance, when you wish to assign one single document to another administration, you can create a new batch with the *New batch* button at the left bottom of the screen, drag the document to it and change the field values.

When the document separation is correct and all field values are filled correctly, all documents can be sent to the next step in the process using the *Save & Next* button in the top menu bar. After pressing this button the Client will also proceed to the next job. When you do not wish to do so, because you want to import documents from another source, you can use the *Save batch* or *Save all* button at the left bottom of the screen.

Note: If you end the process using the *Stop* button in the top menu bar while there are still documents in the list, automatic separation and manual actions performed on these documents up to then are undone. Scanned documents are lost and have to be scanned again. Files, e-mails and such have been stored in the database during import and have therefore been removed from the source. They can be separated again next time using the *Previously imported* button.

Chapter 5

Verifying (Index Job)

This step is basically meant to assign extra data to a document and can appear under different names. When processing invoices, a job called *Verifying* is usually present, in which header and line entry data can be added to the document. An *Editing creditor data* job can also be present, for instance, to create or edit creditors. When processing mail, an *Index documents* job can be present, in which the document type and routing within the organization can be chosen. When starting this job you will see the Figure 5.1 screen.

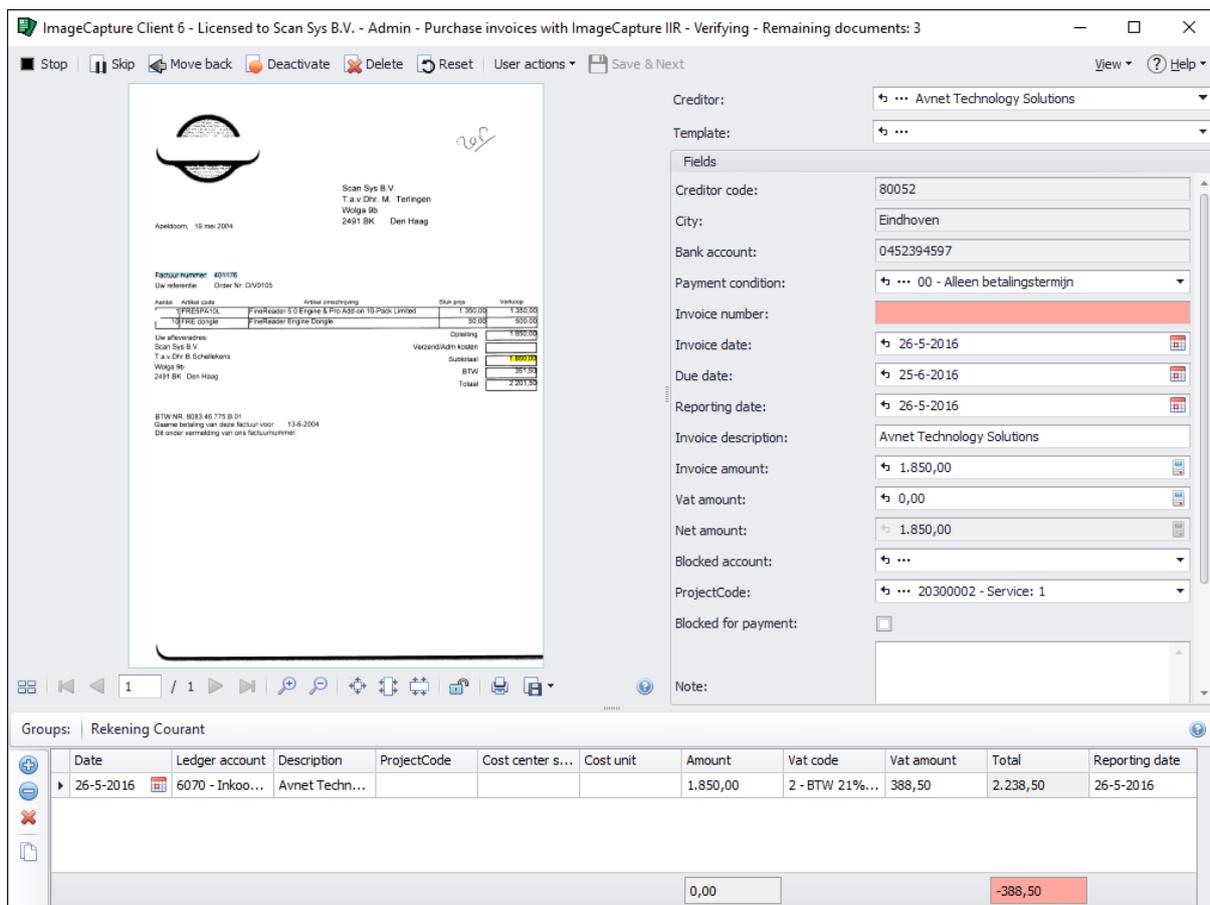


Figure 5.1: Verifying

In this step, depending on the configuration, header and line fields can be filled. Because of

dependencies between these fields it is advisable to fill them in from top to bottom and left to right. In any case, all fields colored red should be corrected, just as with importing. Also check if all other fields are correct. Using the keyboard you can jump to the next or previous field using Tab or Shift+Tab. All automatically extracted values are marked yellow on the document. When you select such a value the marking turns blue. When the extracted value is on a page other than the current one, this page is automatically shown. This behavior can be disabled using the *Lock page* button below the document. You can also extract a value manually using interactive OCR. To do this, select the relevant field, hold down the Shift button and draw a frame around the value to be read using the mouse. When you read an amount using interactive OCR at the header level and you select multiple amounts, then the resulting amount is calculated.

When processing invoices, the very first header field is where the creditor or debtor should be chosen. It is chosen automatically by ImageCapture by reading the bank account and VAT number on the invoice using OCR text recognition and comparing these with the numbers recorded in the underlying application. This automatic link will not work when the quality of the invoice is insufficient or when the numbers found do not match those in the application. In that case, the creditor or debtor can be chosen manually. The automatic identification can potentially be adjusted using a template. A template can be requested when the recognition of invoices of a specific creditor or debtor, or the automatic extraction of its field values, is consistently wrong. You can do this by clicking the button with the three dots in the *Template* field. Check to see if there already is a template for this creditor. If so, you can add a comment by double-clicking the yellow bar. If a template for this creditor does not exist yet, you can create it by clicking *New Template*, see Figure 5.2. Then enter a clear description of the reason why a template is needed. The invoice is then saved separately in the database, so that the application manager can optimize its recognition at a later time.

When line fields are applicable in this step, they are shown at the bottom of the screen. These line fields can for instance be used to particularize invoice lines. Depending on the configuration and underlying application several links can also be made, like linking to existing registrations of tours or orders, for example. Using the buttons left of these lines several actions can be performed, like the addition and removal of lines. It is possible to generate lines automatically by extracting multiple vertically listed values using interactive OCR. This can for example be convenient when dividing lines per article group or VAT code.

Depending on the configuration, extra functions may be available to adjust pages, for instance by rotating them or by creating an annotation with a comment or image.

When all conditions are met, the *Save & Next* button in the menu bar will be clickable. By clicking it or pressing Ctrl+Enter you can advance the document to the next step in the process. You are then presented the next document. When there are no more documents pending in the current step, the Client will proceed with the next job.

Apart from the button *Save & Next*, the menu bar contains a number of useful functions. Depending on your configuration, they might not all be available:

Stop Stops the current process and returns to the list of jobs. Changes in the current document are not saved.

Skip Skips the current document after entering a reason. The next time this job is processed, this document will be presented again.

Skip Again Skips again a document that was skipped before, without having to enter a reason again.

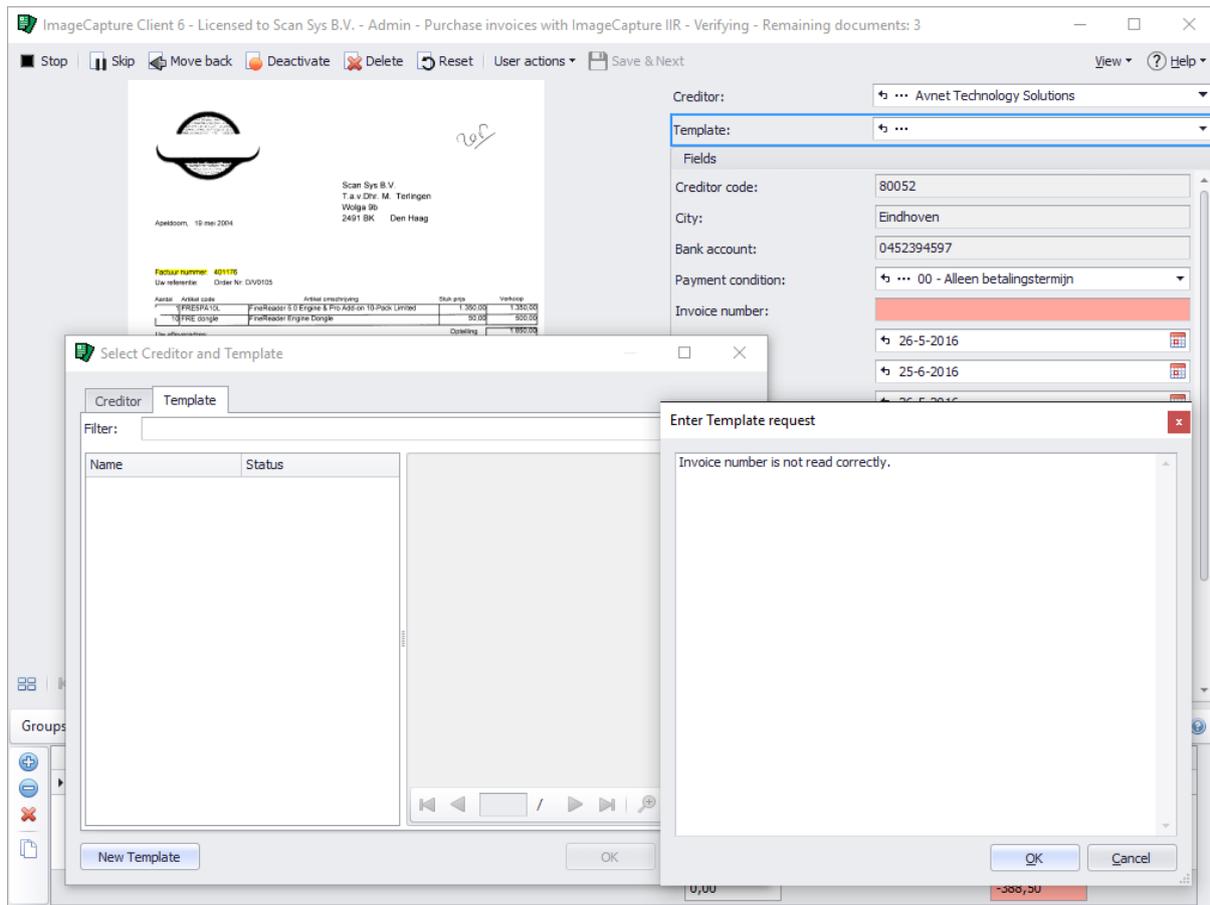


Figure 5.2: Requesting a template

Move back Moves a document to a previous step in the process to be processed again. All current changes are undone.

Deactivate Deactivates the document, so that it will only be presented again after manually activating it via the Documents screen.

Delete Removes the current document from ImageCapture. This action is irreversible!

Restart Undoes all changes to the current document.

Undo queue Offers the possibility to see recently processed documents to, for instance, prevent double entries or to retrieve them and correct mistakes.

User actions Configurable actions for specific links to underlying applications.

View → **Layout** Changes the layout of the screen, including the possibility to split it over multiple screens.

Chapter 6

Linking data (Extended Index Job)

This step is basically meant to link documents to existing data in an underlying application and can appear under different names. When processing freight documents, there usually is a *Linking tour data* job, where the document can be linked to one or more shipments or tours. When starting this job you will see the Figure 6.1 screen.

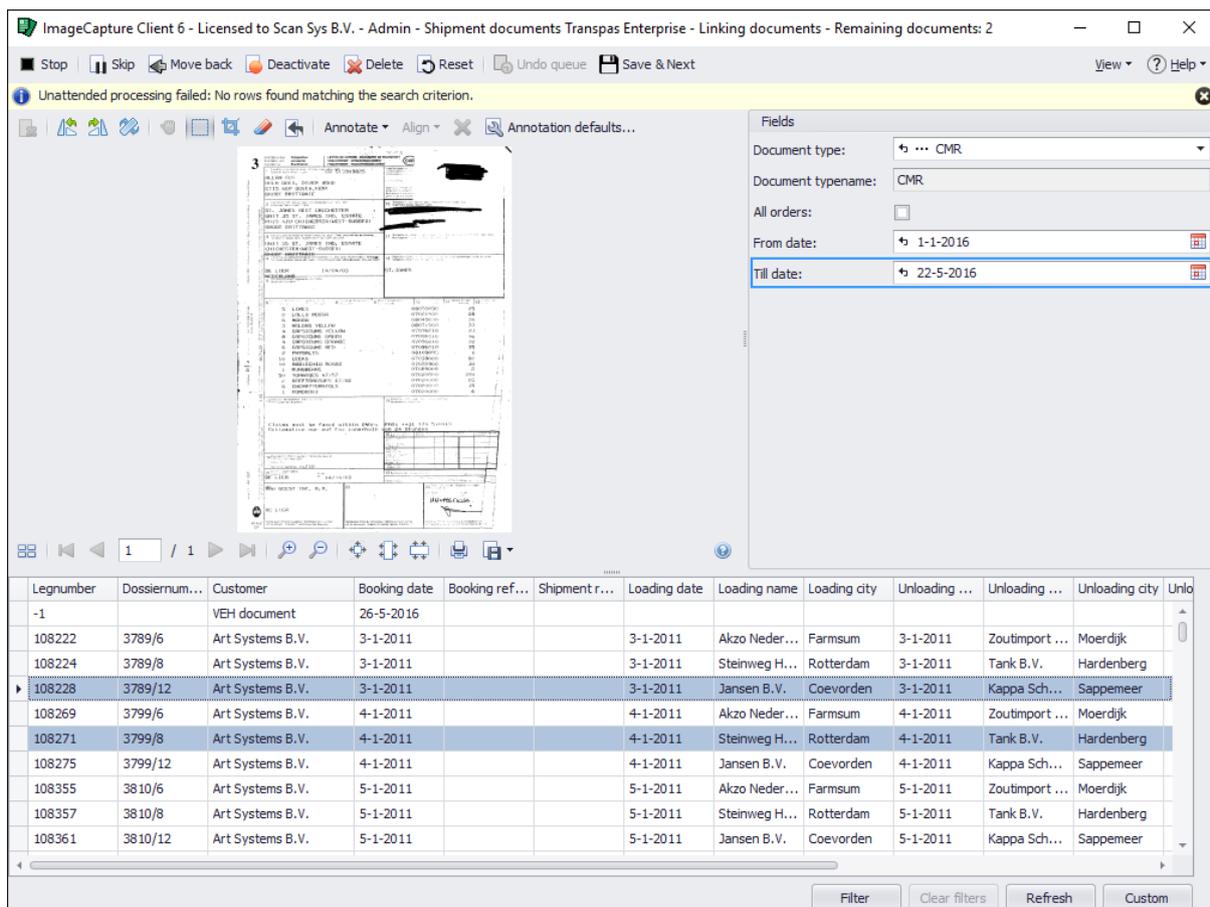


Figure 6.1: Linking data

Broadly speaking this job does the same as the *Verifying (Index Job)* job. The most important difference is that the lines at the bottom of the screen represent data from the underlying application and that these cannot be edited. In this job, the document must be linked to one

or more lines by selecting these lines and clicking *Save & Next* or to only one line by double-clicking it. In the Manager it can be configured so that lines previously linked to a document are indicated by a green color.

Apart from linking the correct line(s), depending on your configuration, it is possible to change field values under the heading *Fields*. In some cases fields will be available that are exclusively used for retrieving the correct lines, like a date range within which the lines should fall. In that case you can click the *Refresh* button at the bottom of the screen after changing these fields to retrieve the new set of lines. When you wish to search for a particular value in the existing set of lines, you can click the *Filter* button. You will see a pop-up in which you can enter the value or select a previously filled in value.

Part III

Application Manager

Chapter 7

Requirements

Subjects in this chapter:

- ImageCapture infrastructure and system requirements.
- Preconditions for links to external applications.

7.1 Infrastructure

7.1.1 Client-Server

ImageCapture consists of several components that comply to the *client-server model*. The Client is fully *multi-user* and can be used concurrently by multiple users from multiple *workstations*, while the database and License Service are installed on a *server* that should be accessible from any workstation. These components need not necessarily all be on the same server, they may also be distributed across multiple servers. Optionally, one or more systems can be configured with the Client Service. Incidentally, in a *single-user* environment all client and server software may be installed on a single workstation.

7.1.2 Network

When ImageCapture is used on multiple workstations or servers, a shared *network folder* is required. This will contain the *global configuration file*, which is used by each workstation and includes the location of the database and the License Service. Additionally, the layout and sheet files of the Barcode Writer are accessible for all workstations through this folder.

7.1.3 Scanner

Scan Sys recommends the use of a local Fujitsu scanner. These come with PaperStream software that also installs the ISIS and Twain drivers. If the ISIS settings are adjusted from ImageCapture via PaperStream, they are all stored in the ImageCapture database and also used on every system. For Twain however, only the settings described in the Twain specification are saved, see <https://www.twain.org/specification>. As a result, only PaperStream settings such as brightness and contrast are saved for Twain. For ISIS, more advanced PaperStream settings are also stored, such as deviating paper sizes and noise reduction.

Scanning with WIA (Windows Image Acquisition) is not supported by ImageCapture.

Furthermore, any network scanner or MFP (Multi Function Product/Printer/Peripheral) with a *scan to file to TIFF with 300 dpi* can also be used to scan documents and import them into ImageCapture.

7.2 Systems

7.2.1 ImageCapture

The installer always installs the combination of both the Client and the Manager so that our support department can access your configuration if necessary. See Table 7.1 for the minimum system requirements. Prior to the implementation process, *the customer* must ensure that all system requirements are met.

Table 7.1: Minimum system requirements ImageCapture

System	Requirements
PC	Connected to protective earth Keyboard and mouse
Processor	Intel® Core™ 2 Duo 2.4 GHz or higher
Memory	4 GB RAM on workstations 500 MB extra RAM per session on servers
Monitor	Video card and monitor Resolution of 1280 x 1024
Network connection	100 Mb/s
Hard disk space	1 GB disk space for installation 10 GB disk space for temporary files per workstation 10 GB disk space for the database
Operating system	Microsoft Windows 7, 8, 8.1 or 10 Microsoft Windows Server 2008 R2, 2012, 2012 R2, 2016 or 2019
Software	Microsoft .NET Framework 4.7.2 Microsoft SQL Server 2012, 2014, 2016, 2017 or 2019
Configuration	For correct operation of the OCR engine, a valid DNS-entry must exist for <i>localhost</i> . This is the case when the command <i>ping localhost</i> gives a result.

7.2.2 Client Service

The Client Service needs 1 GB memory space and 10 GB temporary disk space per requested core/license.

7.2.3 Web Client

The Web Client is a web application that runs under *Internet Information Services (IIS)* on a server. This web application can be used simultaneously by multiple users via a web browser. See Table 7.2 for the additional requirements of the Web Client. All other devices, including smart phones, are not supported.

Table 7.2: Additional system requirements Web Client

System	Requirements
Windows PC/laptop	Chrome (latest version) Firefox (latest version) Edge (latest version) Internet Explorer (latest version)
iMac/Macbook	Chrome (latest version) Firefox (latest version)
iPad	Safari (latest iOS)
Android tablet	Chrome (latest version)
Screen resolution	minimal 768 pixels wide
Browser settings	Cookies enabled Local storage enabled JavaScript enabled
Server	Microsoft IIS 7.0 SP1 or higher

The Web Client can only be used over an encrypted connection (https). For use in a production environment a Trusted Certificate is therefore required. In for instance a test environment a Self-Signed Certificate can also be created during the installation.

For correct operation of the Web Client, the installation of a number of IIS components is required. These components can be installed on the *Windows Features* screen under *Internet Information Services*.

- Web Management Tools:
 - IIS Management Console
- World Wide Web Services → Application Development Features:
 - .NET Extensibility *
 - ASP.NET *
 - ISAPI Extensions
 - ISAPI Filters
- World Wide Web Services → Common HTTP Features:
 - Default Document
 - Static Content
- World Wide Web Services → Security:
 - Request Filtering
 - Windows Authentication **

*: Recent versions of IIS contain multiple versions of these components. In that case, version 4.x is required.

** : This component is only required when using Windows authentication to log in to the Web Client.

7.2.4 License Service

In order to use ImageCapture, the License Service with an activated license is required. The License Service manages the logged-on users and is responsible for keeping track of active

sessions and releasing class locks and document locks in the database.

Preferably, the License Service is only installed once on a central server. The system requirements in terms of the operating system and the software required for the License Service are similar to those of ImageCapture, see Table 7.1.

7.2.5 Barcode Writer

When working with the so-called barcode sticker sheets, the Barcode Writer must be installed on a workstation on which they can be directly printed.

7.2.6 SQL Server

See Table 7.1 for the supported versions of SQL Server. The following requirements apply to the configuration:

- The option *Allow Triggers to Fire Others* must be enabled on the SQL Server instance used.
- Workstations must be able to connect to SQL Server:
 - The SQL server must allow remote connections.
 - The TCP/IP protocol must be activated.
 - The firewall must allow connections to SQL Server.

ImageCapture can be used in conjunction with the free Microsoft SQL Server Express editions. However, note that those have the following limitations:

- The maximum database size is 4 GB (2008) or 10 GB (2008 R2 and up).
- Only 1 processor and at most 4 cores are used.
- At most 1 GB RAM is used.

7.3 Permissions and management

7.3.1 SQL Server

The ImageCapture database must be created with SQL Server *sa-permissions*. For daily use, *dbo-permissions* are required. The database should run synchronously with your customer backup procedure.

7.3.2 ImageCapture

The ImageCapture installer must be executed with *Windows Administrator* permissions. During installation, all the required third-party software will also be installed on your system. Shortcuts for starting the Client and Manager will be created in the Windows Start Menu as well. See Table 7.3 for the precise locations.

In order to be able to fully uninstall ImageCapture at a later date from the list of installed programs, a number of registry keys will be created during the installation. See Table 7.4 for a precise overview of what will be created in the Windows registry.

The system permissions necessary for daily use are described in Table 7.5, whereby ImageCapture runs on 64-bit systems as a 32-bit process in Windows-on-Windows.

Table 7.3: Installed software ImageCapture

Software	Location
ImageCapture	<installation folder> ¹ <start menu> ²
Leadtools OCR Runtime Export libraries ³	<installation folder>\OcrRuntime <installation folder>\Libraries
Microsoft C++ Runtime	%WINDIR%
Pixtran ISIS ⁴	%WINDIR%\Pixtran

Table 7.4: Created keys in Windows Registry

Key	Name	Value
<software> ⁵	Install_Dir	<installation folder>
<uninstall> ⁶	DisplayName	Scan Sys ImageCapture 8.18
<uninstall>	NoModify	1
<uninstall>	NoRepair	1
<uninstall>	UninstallString	<installation folder>\uninstall.exe

Table 7.5: Permissions for the daily use of ImageCapture

Description	Location	Permissions
ImageCapture	<installation folder>	read/execute
system settings	ImageCapture.ini ⁷	read/write
global settings	Global.ini	read
	set in ImageCapture.ini	
user preferences	Client.ini and Manager.ini	read/write
“temp” folder	local folder	read/write
	set in ImageCapture.ini	
log folder	local folder	read/write
	set in ImageCapture.ini	
database	SQL Server	dbo on database
	set in Global.ini	
Leadtools temp	parent folders of %TMP%	list
	%TMP%	read/write
Accusoft SSM	%TMP%\Accusoft	read/write
Pixtran ISIS	%WINDIR%\Pixtran	read
System files	%WINDIR% and %WINDIR%\System32	read

¹The default installation folder is: %PROGRAMFILES%\Scan Sys\ImageCapture 8.18, but this can be changed if required during the installation.

²Location of Windows Start Menu: %PROGRAMDATA%\Microsoft\Windows\Start Menu\Programs

³During installation, all dynamic link libraries are registered with regsvr32.exe.

⁴The Pixtran ISIS files are only used for scanning, but they are required for starting the Client and Manager.

⁵HKLM\Software \Scan Sys\ImageCapture 8.18

⁶HKLM\Software \Microsoft \Windows \CurrentVersion \Uninstall \ImageCapture 8.18

Description	Location	Permissions
Microsoft .NET Framework Microsoft C++ Runtime external applications	see Section 7.4	read/write

7.3.3 License Service

The License Service installer must be executed with *Windows Administrator* permissions. During the installation, only files will be copied to the installation folder. The default installation folder is %PROGRAMFILES%\Scan Sys\ImageCapture License Service, but this can be changed if required.

After running the installer, the License Service must be registered as a Windows Service using a separate batch script. Optionally, the executing user of this service can be changed.

Finally, the system permissions necessary for daily use are described in Table 7.6.

Table 7.6: Permissions for the daily use of License Service

Description	Location	Permissions
License Service	<installation folder>	read
system settings	LicenseService.ini ⁸	read
log folder	local folder set in LicenseService.ini	read/write
license folder	local folder set in LicenseService.ini	read/write

7.3.4 Kofax

During the installation of Kofax on Windows 7 or higher *UAC* must be turned off.

7.3.5 Common problems

- Several users have reported that anti-virus software can prevent ImageCapture from starting, or can cause it to shut down unexpectedly. In the event of such a problem, check first to see whether your anti-virus software is the cause.
- On systems where the user permissions are strictly controlled, it is possible that the imaging component of ImageCapture will cause problems. This is because a component of Accusoft is trying to save temporary (.ssm) files to the Windows temp folder (%TMP%) in a subfolder called Accusoft. If this is not possible, this can cause multiple errors in ImageCapture, including the unhelpful message “Illegal characters in path”. This can be

⁷The location of the ImageCapture system settings is always: %PROGRAMDATA%\Scan Sys\ImageCapture\ImageCapture.ini 8.18, this cannot be changed.

⁸The location of the License Service settings is always: %PROGRAMDATA%\Scan Sys\License Service\LicenseService.ini, this cannot be changed.

solved by expanding the permissions of the current user within Windows, but alternatively, there is a workaround available. Place a text file called `pegasusworkerloader.ini` in the folder `<installation folder>\ImageCapture` or, when this occurs in the Client Service, `<installation folder>\ClientService`. Make sure the file has the following contents, whereby the completed path points to a folder where the user who is starting ImageCapture has write permissions:

```
[pegasusworkerloader]
tempdir = C:\Users\Public\AppData\Local\Temp
```

7.4 Interfaces to external applications

A number of specific interfaces to external applications require extra attention, such as special system permissions or additional software. This additional software is only required on the system upon which the interface will actually be used. For example, on systems where no exports will be carried out, the installation of additional software is not required.

Chapter 8

New Installation

Subjects in this chapter:

- Installing and configuring the License Service and ImageCapture.
- Creation of the database from the Manager.
- Adding and activating your license.
- Silent installation and virtualisation.

8.1 SQL Server

Prior to the installation of ImageCapture, a SQL Server must first be installed, see the system requirements in Section 7.2 for details on supported versions. If there is no SQL Server installed, a SQL Server Express edition can be used free of charge. Scan Sys is not aware of your IT infrastructure, so we will not install an SQL Server.

8.2 License Service

Before the installation of the License Service, determine whether your situation is a *single* or *multi-user environment* and decide where the License Service will run from:

- Start the installer `<installation cd>\Tools\ImageCapture License Service 5.4.2.exe`, or a higher version.
- Accept the default installation folder and continue the rest of the wizard.
- Run the script `<installation folder>_install.bat` to register the License Service in Windows. If the registration completes successfully, the command window will display the message “The transacted install has completed”.

The settings of the License Service are stored in the file `LicenseService.ini`¹, which will be automatically created with the default settings the first time the License Service is started. This configuration file can also be created manually beforehand or subsequently changed using the License Service Config Tool from the installation folder:

- Start the `LicenseServiceConfigTool` in the installation folder.

¹The location of the License Service settings is always: `%PROGRAMDATA%\Scan Sys\ImageCapture\LicenseService.ini`, this cannot be changed.

- Click on the two plus buttons to create the log² and license folder³.
- Use the suggested port, unless it is already in use.
- Confirm the changes with OK to save the `LicenseService.ini`.

Finally, start the License Service:

- The License Service can be started from the *Services* screen in *Administrative Tools* on the *Control Panel*, or with the included `_start.bat` script in the installation folder.
- Initialisation errors are written to the *Application Log* in Windows, which is available via the *Event Viewer*. Upon completion of the initialisation, it will be logged in the defined log folder.

8.3 ImageCapture

Before installing ImageCapture, decide the following:

- Will ImageCapture be used from multiple workstations?
- On which SQL Server will the database be installed?
- Where will the ini file for global settings be?

8.3.1 Installation on a workstation

- Start the installer `<installation cd>\ImageCapture 8.18.x.exe`.
- By default, *Manager and Client* will already be checked. Do not yet choose for *Client Service* or *Web Client*, their installation and configuration will be discussed later.
- Choose *ImageCapture.ini* if you already have a system settings file configured and want this to be copied onto the local workstation by the installer.
- Choose *Installer backup* if you wish to retain the installer on your local workstation as a backup after installation.
- Only change the default installation folder if absolutely necessary. Always use the version number in the last sub folder, because of future updates to new major versions.
- Continue the rest of the wizard.

8.3.2 System settings

The ImageCapture system settings are stored in the file `ImageCapture.ini`⁴, which is automatically created when starting the Manager:

- Now start the Manager for the first time via the *Start menu* → *All Programs* → *Scan Sys* → *ImageCapture 8.18 Manager*.
- Open the menu *Tools* → *Options*.
- Choose the tab *Machine* for the system settings.
- Set *Global config path* to the desired location of the global settings, including the file name and the extension `.ini`. Now press the plus sign to create the ini file.

²Default log folder: `%PROGRAMDATA%\Scan Sys\ImageCapture\Log`

³Default license folder: `%PROGRAMDATA%\Scan Sys\ImageCapture\Licenses`

⁴The location of the ImageCapture system settings is always: `%PROGRAMDATA%\Scan Sys\ImageCapture\ImageCapture.ini 8.18`, this cannot be changed.

Global config path Location of the ini file for the global settings. For example, use `ImageCaptureGlobal.ini` as the file name.

In a *single-user* environment this file is stored on the local workstation. In this case, use the same folder as for the system settings, i.e. `%PROGRAMDATA%\Scan Sys\ImageCapture`.

In a *multi-user* environment, this file is shared with all other workstations and must be stored on a shared network folder.

8.3.3 Environment settings

The ImageCapture environment settings are also stored in the file `ImageCapture.ini`⁵:

- Choose the tab *Environment*.
- Fill in the settings in this tab and confirm with OK.

Temp folder The temporary folder must always be stored locally. This folder should never refer to the network because this will have a very negative effect on the speed of ImageCapture.

Log folder The log folder must also be stored locally, due to speed and the ability to log network faults.

Enable verbose logging Only enable this option at the request of Scan Sys.

Client priority Only use this option at the request of your system manager.

8.3.4 Global settings

The ImageCapture global settings are also stored in an ini file. Its location is described in the previous step.

The first global setting is which SQL Server and ImageCapture database should be used. In this chapter we will therefore start by creating a new, empty ImageCapture database:

- Open the menu *File* → *Create Database...*
- Set the *Admin credentials* to a user with *sa-permissions*. These credentials will only be used once for creating the database.
- Set *Daily use credentials* to a user that ImageCapture will be using to access the database. This user will become *dbo* of the database. We recommend using *user name scansys* and a strong, unique password. In the event that this user does not yet exist, the user will be automatically created by ImageCapture. The use of Windows authentication is only possible if all Windows users who are going to start up ImageCapture receive the correct permissions on the associated server and database. This includes the Windows user under which any Client Service may be running and, in the case of the Web Client, the Windows user under which IIS is running.
- Note that we recommend to not change the proposed *database name*, because its name includes the version number of the database. This is especially useful during updates if there are multiple ImageCapture databases stored on the server.

⁵The location of the ImageCapture system settings is always: `%PROGRAMDATA%\Scan Sys\ImageCapture\ImageCapture.ini`, this cannot be changed.

- Note that, starting from ImageCapture 4.3, all images are stored in the database instead of in a separate *global data folder*. Such a folder will therefore no longer need to be specified.
- Confirm with OK to create the database and to remember it as a global setting.
- Log in using an administrator user. The default administrator user has user name `Admin` and password `Admin`.

Next configure the location of the newly installed License Service:

- Open the menu *Tools* → *Options*.
- Choose the tab *Global*.
- Under *License Service* fill in the *host* and *port*.
- Confirm the modified settings with OK.

Finally, add your license and activate it via Scan Sys:

- Open the menu *File* → *Add New License*.
- Choose your license file, which has probably been sent to you by e-mail.
- For *name*, only change the default name `license` if your License Service will host multiple licenses.
- Confirm with OK.
- Open the menu *File* → *Activate Current License*.
- Call Scan Sys during business hours on 0031 (0)15 - 310 20 40 and ask for an activation code for your license.

8.3.5 Database settings

Some settings are stored in the database:

- Open the menu *Tools* → *Options*.
- Choose the tab *Database*.

These include the possibility to customize the Web Client with a custom company logo, name and URL. This is particularly useful in cases where the Web Client is opened up to external users that have no direct relationship with Scan Sys. It is also possible to configure the *Sessions & Locks* screen and the various *Credential* screens to be shown to Administrators only. This is useful in shared environments where users are not allowed to view user names and external accounts of other users.

8.3.6 User preferences

For each user, the locations and sizes of the Manager and Client screens are stored separately in the folder `%APPDATA%\Scan Sys\ImageCapture`. In the Client, you can change the language of your ImageCapture configuration:

- Open the menu *Tools* → *Options* in the Client.
- Choose the tab *User*.
- Choose the desired language and confirm with OK.

8.4 Client Service

The Client Service can be installed on a server or on a workstation. It is recommended to be installed on a server because it is always running. See Chapter 10 for technical information about the Client Service.

Install the Client Service on a server:

- Start the installer `<installation cd>\ImageCapture 8.18.x.exe`.
- Choose *Client Service*.
- Only change the default installation folder if absolutely necessary. Always use the version number in the last sub folder, because of future updates to new major versions.
- Continue the rest of the wizard.

Configure the Client Service in the Manager:

- Start the ImageCapture Manager.
- For every Import and Index Job, set the visibility of all fields to *On error or If Processing attended*, otherwise this Job cannot be processed unattended.
- An Import Job will only be processed unattended if it contains Importers that allow unattended processing. For example, for a File Importer, choose the tab *Processing*:
 - Check *Allow unattended import in Client Service*.
 - Check *Allow unattended preprocessing in Client Service*.
 - Determine whether or not the Client Service is allowed to perform document separation by (un)checking *Separate unattended*.
 - Determine what should happen if a document contains validation errors in the Import Job. Select *Process attended* to process these documents manually or *Mark as errored* to give them the status *Errored*. The latter option disallows further processing in ImageCapture, but allows the imported files to be saved to disk to process them in a different manner.
- Change all network paths with drive letters to UNC paths at *Tools* → *Options* and all Importers and Exports.
- Go to *Tools* → *Options*:
 - Choose on the tab *Machine* the desired number of *cores*.
 - Set on the tab *Environment* the *User name* to a user that supports *ImageCapture authentication* and is a member of a *User Group* that is linked to a license group that allows the use of the Client Service.

Configure the Client Service in Windows:

- Execute the script `<installation folder>\ClientService_install.bat` with administrator permissions to register the Client Service in Windows. If the registration completes successfully, the command window will display the message “The transacted install has completed”.
- Go to *Control Panel* → *Administrative Tools* → *Services*:
 - Set *ImageCapture Client Service* to start up automatically.
 - Set *Log On As* to an account with sufficient permissions.
 - Start the *ImageCapture Client Service*.

8.5 Web Client

First install and configure the ImageCapture Manager and Client on the same server that the Web Client will be running on. Ensure the Client can open a class without error messages before continuing with the installation and configuration of the Web Client and *Internet Information Services (IIS)*.

8.5.1 Installation on a server

Install the Web Client on the server where IIS is running:

- Start the installer <installation cd>\ImageCapture 8.18.x.exe.
- Choose *Web Client*.
- Only change the default installation folder if absolutely necessary. Always use the version number in the last sub folder, because of future updates to new major versions.
- Continue the rest of the wizard.

8.5.2 Configuration of IIS

Give the group *Authenticated Users* read and write permissions on the folder <log folder> (default %PROGRAMDATA%\Scan Sys\ImageCapture\Log).

Go to *Control Panel* → *System and Security* → *Administrative Tools* and start *Internet Information Services (IIS) Manager*:

- Under *Connections* at the left, select the text *Application Pools* and under *Actions* at the right, choose *Add Application Pool...* Enter a name, e.g. *ImageCapture*, and then choose *.NET Framework v4.0.xxxxx*. Confirm with OK.
- Select the newly created application pool in the list and under *Actions*, choose *Advanced Settings...*
 - Set the *Enable 32-Bit Applications* option to *True*.
 - Under *Process Model* select the line *Identity* and click the three dots behind *ApplicationPoolIdentity*.
 - Enter the user name and password of a Windows user with sufficient permissions, see Table 7.5. Confirm with OK.
 - Under *Recycling* set the option *Regular Time Interval (minutes)* to 0.
 - Confirm with OK.
- Under *Connections* at the left, under *Sites*, choose the *Default Web Site*. In the context menu (right mouse click), choose *Add Application...*
 - Enter an *Alias*, e.g. *ImageCapture*.
 - Click on the *Select...* button and select the newly created application pool. Confirm with OK.
 - For *Physical path*, use <installation folder>\WebClient. Note that *Test Settings...* does not work yet. Confirm with OK.
- If the Web Client must use Windows authentication:
 - Expand the newly created application to display its subfolders.
 - Right click on *WinAuth*.
 - In the context menu, click *Convert to Application* and confirm with OK.
 - Select the newly created application *WinAuth* if it is not selected yet.
 - Under *IIS*, double-click *Authentication*.

- Set *Windows Authentication* to *Enabled* and all other methods to *Disabled* in the list of authentication methods.
- Only create a new *Self-Signed Certificate* if you do not own a *Trusted Certificate* yet. Using a *Self-Signed Certificate* is a security risk and is not suitable for production environments:
 - Under *Connections* at the left, select the server name and double click on *Server Certificates* in the middle column.
 - Under *Actions*, choose *Create Self-Signed Certificate* and give it a name.
- Add an HTTPS binding:
 - Select the *Default Web Site* and, under *Actions*, choose *Bindings...*
 - Click on the *Add...* button and select *https* for *Type*.
 - Select your own *Trusted Certificate* or the newly created certificate for *SSL certificate* and confirm with OK.
- Under *Sites*, select the ImageCapture application and under *Actions*, choose *Browse *:443 (https)*. The log-in screen of the Web Client will now be displayed. When using a *Self-Signed Certificate*, a warning will be shown indicating that the connection is not secure which has to be ignored in that case.

8.5.3 Configuration of ImageCapture

Windows authentication

Enable Windows authentication in the Web Client by executing the following steps:

- Open the menu *Tools* → *Options* in the Manager.
- Choose the tab *Global*.
- Under *Web Client* check *Allow Windows authentication*.
- Confirm the modified settings with OK.

Database permissions

If *Windows authentication* is used to connect to the ImageCapture database and/or external databases, the Windows user under which IIS runs must have permissions to access those databases. This does not apply to *SQL Server authentication*, because in that case the user name and password for the database have been defined in the Manager.

Changes to the configuration

Recycle the application pool after making changes to the system or global settings from the Manager in order to use the new settings in the Web Client. To do this, use the `<installation folder>\WebClient_recycleAppPool.bat` script, or execute the following steps:

- Go to *Control Panel* → *System and Security* → *Administrative Tools* and start *Internet Information Services (IIS) Manager*.
- Under *Connections* at the left, select the text *Application Pools* and select the application pool for ImageCapture in the middle column. Under *Actions* on the right, choose *Recycle...*

Changes to classes, tables, etc. will be automatically loaded in the Web Client without recycling the application pool.

8.5.4 Security aspects

When using the Web Client, some security aspects must be kept in mind. It is important to take these seriously and determine which of these aspects are relevant to your situation.

ClientAdmin and PowerAdmin logins

ImageCapture has two built-in login accounts that partners and employees of Scan Sys can use to log in, even if the maximum number of simultaneous users has been reached or if the normal Admin password is unknown. These login accounts are disabled by default for the Web Client. They can be enabled in the Manager via *Tools* → *Options* → *Global* → *Web Client* → *Allow ClientAdmin and PowerAdmin logins*. If the Web Client can be reached from outside your local network, it may be wise to leave these logins disabled.

Visibility of template images

Via *Users* and *User Groups*, users of the Web Client can be configured to not see each others documents. In this case, it is also important to make the images of templates invisible, otherwise the invoice upon which a template is created will be visible to all users. You can configure this behaviour in the Manager at the relevant *Index Job* by unchecking *General* → *Identification Settings* → *Display template images for non-template users*.

Password Field

When the value of a *Password Field* is set in a job which is executed in the Web Client, end users can view the unencrypted password through the built-in Developer Tools of the web browser. This is not a problem if the user has to set the value manually. However, if the field is filled from an external source, it is recommended to do that in an earlier unattended job, to prevent end users from viewing the password.

IIS headers

IIS sends a number of headers back to the browser with every web page. If desired, you can set up IIS so that certain headers will or will not be sent. Check the documentation for your version of IIS for how to do this exactly.

Server header It is a good idea to disable this header, because it contains information about the version of IIS that may help hackers to gain access to the server.

X-Frame-Options header It is recommended that this header be enabled to prevent so-called *clickjacking* attacks, because it forbids the browser to show the web page within another web page.

8.5.5 Common problems

No access to eventlog

When the Web Client does not have access to the eventlog, this can be fixed by giving the user IIS_IUSRS full permissions on the eventlog registry key:

- Start the *Windows Registry Editor*, e.g. via *Start* → *Run* → *regedit*.
- Go to the key HKLM\SYSTEM\CurrentControlSet\services\eventlog.

- In the 'eventlog' context menu, choose *Permissions...*
- Add the IIS_IUSRS user and give the user *Full Control*.

HTTP Error 404 - Not Found

The error message indicates that the page you requested cannot be found. In the case of the Web Client this can be the result of too few access permissions.

- Go to *Control Panel* → *System and Security* → *Administrative Tools* and start *Internet Information Services (IIS) Manager*.
 - Under *Connections* at the left, under *Sites*, select the ImageCapture application and under *Actions* choose *Basic Settings...* Select *Connect as...* and enter the credentials of the Administrator under *Specific User*.
 - Recycle the application pool.
- Reload the web page and check that it is working correctly.
- Return to the *Internet Information Services (IIS) Manager*.
 - Reset the *Path credentials* to *pass-through authentication*.
 - Recycle the application pool once more.
- The web page should now work properly.

HTTP Error 500.19 – Internal Server Error

This error occurs if not all required IIS components have been installed, see Section 7.2.3.

After installation of a required component, it may be necessary to recreate the application pool, see Section 8.5.2.

HTTP Error 500.21 - Internal Server Error

This error occurs if *ASP.NET* has not been registered yet:

- Stop *IIS*.
- Start *cmd.exe* as administrator.
- Execute: `C:\Windows\Microsoft.NET\Framework\v4.0.30319\aspnet_regiis.exe -i`
- Start *IIS*.

8.6 Silent installation

A *silent installation* runs without any user interaction and without a user interface. This means the user will see so no screens and will not be asked anything. This is useful for application managers who want to install ImageCapture on several systems, maybe even from an automated script.

First make sure that you are fully familiar with the normal installation and configuration procedure before you start with silent installations. A silent installation always installs the Manager and Client. If a 'ImageCapture.ini' file exists alongside the installer, it is automatically copied to the correct location.

A silent installation is started via the *command line* and supports the following parameters. Please note that these command line parameters are case sensitive:

/S Start a silent installation without screen. The installer installs everything without further user interaction being required.

/CLIENTSERVICE Install the Client Service as well.

/D Use a different default installation folder. This must be the last parameter on the command line and it may not contain quotes, even if the folder contains spaces. Only absolute paths can be used. This parameter can also be used in a normal installation with a user interface.

Example of a silent installation in the default installation folder:

```
ImageCapture 8.18.x.exe /S
```

Example of a silent installation in a different folder:

```
ImageCapture 8.18.x.exe /S /D=F:\Applications\ImageCapture 8.18
```

The following batch script provides an example of performing a silent installation:

```
@ECHO OFF
ECHO Installing ImageCapture...

START "" /WAIT "ImageCapture 8.18.x.exe" /S
IF %ERRORLEVEL% NEQ 0 GOTO ERROR

ECHO Completed.
GOTO DONE
:ERROR
ECHO Failed with error code %ERRORLEVEL%.
EXIT /B %ERRORLEVEL%
:DONE
```

8.7 Virtualisation

In various customer situations, ImageCapture is *virtualised* with Citrix, Terminal Server or App-V. However, it is not possible to control a local scanner in these situations.

Scan Sys has no specialist knowledge of these virtual environments and provides *no support* for these kinds of environments and any resulting problems.

8.8 Miscellaneous

There is a separate installer for the Barcode Writer with its own version number and release schedule.

Chapter 9

Updating Current Installation

Subjects in this chapter:

- Updating ImageCapture.
- Updating the database from the Manager.

9.1 ImageCapture

From ImageCapture 4.0 onwards it is possible to update the existing configuration to the most recent version of ImageCapture. There are two types of update:

- A *major update* (from ImageCapture 4.4 to ImageCapture 4.6 or to ImageCapture 5.1)
- A *minor update* (from ImageCapture 4.4.5 to ImageCapture 4.4.17)

With an update to a new major release, a new installation folder will be created in the Program Files directory so that, if necessary, it will be easy to switch back to the version already installed. The ImageCapture database must also be updated with a new major release. To be able to work in the updated database, the ImageCapture software must be updated on all workstations.

With a minor update, the old installation folder is usually overwritten. In that case, it will only be possible to switch back to the former version by reinstalling that version over the new version.

9.1.1 Beforehand

Before performing an update, it is important to consider these issues:

- First check whether the current workstation still meets the system requirements that correspond with this version of ImageCapture. For example, perhaps you use a version of Windows or of Microsoft SQL Server that is no longer supported by the new version of ImageCapture.
- With this update, check whether there are any update issues that are relevant to you. If in doubt, contact Scan Sys for advice before proceeding with the update.

9.1.2 Updating software

To update the software, the following steps must be executed with *Windows Administrator* rights:

- If the Client Service is installed on this system:
 - Open the *Services*¹ screen in Windows.
 - Stop the ImageCapture Client Service, if it is running.
 - Also stop the ImageCapture Client Service Scheduler if it has been installed and is running.
- If the Client Service is installed on this system and you are performing a major update:
 - Open the Windows *Services* screen in Windows.
 - Right click on the ImageCapture Client Service, choose *Properties* and select the tab *Log On* (see Figure 9.2).
 - Note the user under which this service is running. You will need this information later.
 - Delete the old Client Service from the Services screen by running the script `<installation folder>\ClientService_uninstall.bat` in the installation folder of the old version of ImageCapture.
- If the Web Client is installed on this system:
 - Start the *Internet Information Services (IIS) Manager*².
 - On the left, under *Connections*, select the ImageCapture application under *Sites* and under *Actions* choose *Basic Settings...* Note which Application pool is used by ImageCapture. You will need this information later.
- If the Web Client is installed on this system and you are performing a minor update:
 - Start the *Internet Information Services (IIS) Manager*.
 - On the left, under *Connections*, select the text *Application Pools*, then select the Application pool for ImageCapture in the middle. On the right, under *Actions*, select *Stop*.
- Run the file `<installation cd>\ImageCapture 8.18.x.exe` to start the installation wizard.
- Click on *I Agree* to agree with the license agreement.
- The installation wizard will now display the list with components to be installed (see Figure 9.1). Check Client Service and/or the Web Client if you use these on this system and click on *Next*.
- You now have to choose the folder in which ImageCapture will be installed:
 - If you are performing a major update, it is recommended to use the standard folder.
 - If you are performing a minor update, adjust the Destination Folder to the folder in which ImageCapture was previously installed. This is only necessary, when the default folder was changed during the original installation.
- Click on *Install* to start the installation.
- After completion of the installation, click on *Close* to close the installation wizard.
- If the Client Service is installed on this system:
 - If you are performing a major update, run the script `<installation folder>\ClientService_install.bat` in the installation folder of the new version to add the new Client Service to the Services screen.
 - Open the Windows *Services* screen in Windows.

¹Control Panel → System and Security → Administrative Tools → Services

²Control Panel → System and Security → Administrative Tools → Internet Information Services (IIS) Manager

- If you are performing a major update, configure the Client Service user via *Properties* → *Log On* of the ImageCapture Client Service. Enter the same user as in the previous version, as noted earlier.
- Start the ImageCapture Client Service.
- If the Web Client is installed on this system and you are performing a major update:
 - Start the *Internet Information Services (IIS) Manager*.
 - On the left, under *Connections*, select the ImageCapture application under *Sites* and under *Actions* choose *Basic Settings...*. Here, change the *Physical path* to the new location on the local disk.
 - If you use Windows authentication in the Web Client:
 - * Expand the ImageCapture application to display its subfolders.
 - * Select the *WinAuth* folder and under *Actions* choose *Basic Settings...*. Here, change the *Physical path* to the new location on the local disk.
 - On the left, under *Connections*, select the text *Application Pools*, then select the Application pool for ImageCapture in the middle. On the right, under *Actions*, select *Recycle* or, if the Application pool is not yet active, select *Start*. As an alternative to this step, you can run the script <installation folder>\WebClient_recycleAppPool.bat.
- If the Web Client is installed on this system and you are performing a minor update:
 - Start the *Internet Information Services (IIS) Manager*.
 - On the left, under *Connections*, select the text *Application Pools*, then select the Application pool for ImageCapture in the middle. On the right, under *Actions*, select *Start*.

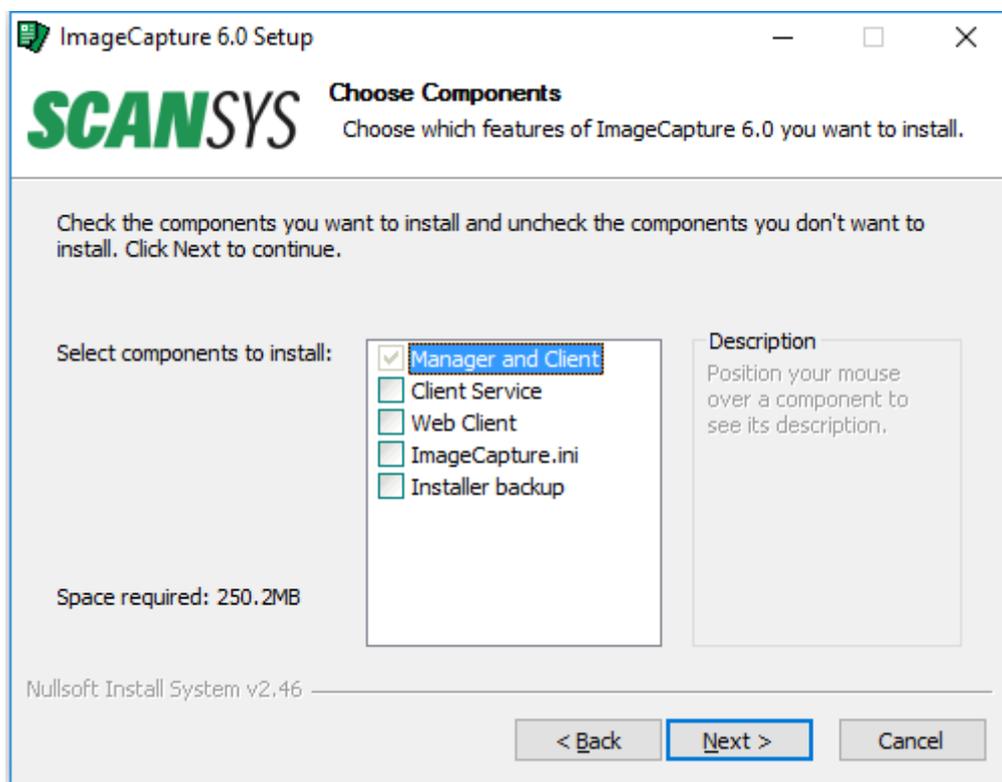


Figure 9.1: Choosing components

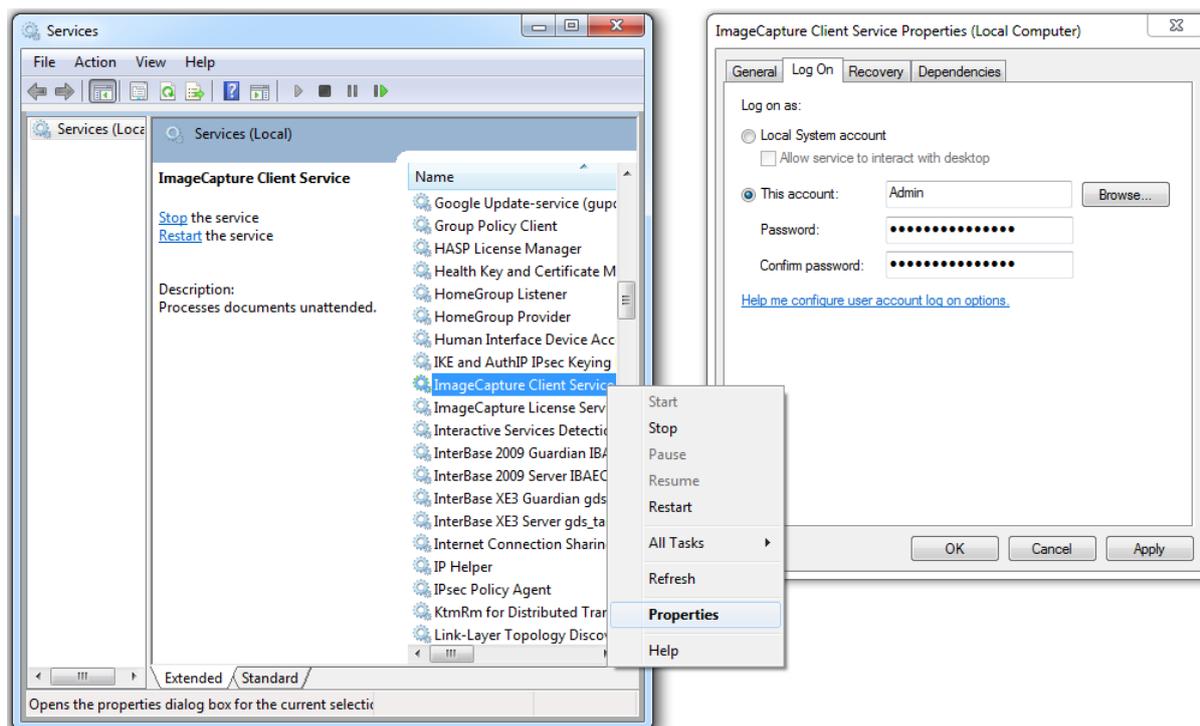


Figure 9.2: Configuring Client Service user

9.1.3 Updating database

After performing a major update of the software, the database will need to be updated. For this update, it is advisable to ask all ImageCapture users within your organization to close the application before the update commences. For updating the database, various update methods are available. It is important to decide beforehand which method you are going to use, because this update has an impact on all the users within your organization:

Create and update copy This is the standard method. With this method, a copy is created of the existing database, after which the copy is updated. When using this method, it is important that good agreements are made with all ImageCapture users regarding the moment of the update and the procedure around it. The data in the ImageCapture database is by default saved upon update, which means that, with this method the data will be located in both the old and the new version following update. Because the old database remains unchanged, users at other workstations with the old version of the ImageCapture software, can continue to work with the old database. However, this brings the risk that data is processed in duplicate, namely in both the old and the new database. This can be prevented in a number of ways:

1. Ensure all data has been fully processed before starting the update.
2. During the update, delete all data from the new database by enabling the checkbox *Delete all data from target database* and continue to process old documents with the old version of ImageCapture.
3. Arrange with all users that they will all work with the new version from the moment of the update.

The advantage of this method is that it is the easiest way to use the old and the new versions alongside each other. This can be useful, for example if several users would

like to test out the new version while other users wish to continue working with the old version. With this method, if the new version works to your satisfaction, you will have to delete the old database manually.

Create backup and update original Here a backup of the existing database is created on the hard disk, after which the existing database is updated. The advantage of this method is that users at other workstations cannot accidentally continue to work with the old version and that you are not left with an old database after the update. However, with this method you will have to take additional steps if you still wish to use the old version of Image Capture.

Create copy and update original Here a copy of the existing database is created on the SQL Server, after which the existing database is updated. The advantage of this method is that users at other workstations cannot accidentally continue to work with the old version. However, with this method you will have to take additional steps if you still wish to use the old version of ImageCapture. Also, the database copy will remain in existence after the update and, if the new version works to your satisfaction, you will have to delete the database copy manually.

To update the database, follow the steps below:

- Start the ImageCapture Manager.
- You will receive the notification that the existing database is not the correct version. Click on *OK* to close this message.
- Go to *File* → *Update Database*. You will now see the screen as shown in Figure 9.3. Here, proceed with the following steps:
 1. Under *Connection settings*, enter the name of the SQL Server instance. Optionally, the timeouts can be changed here.
 2. Under *Admin credentials*, enter a user with *sa permissions*. These credentials will only be used once, for the creation of the database.
 3. Under *Daily use credentials*, enter a daily user that will from now on be used by ImageCapture to access the database. If this user does not yet exist on the chosen SQL Server instance, it will automatically be created.
 4. Click on *Retrieve databases* to retrieve the list of ImageCapture databases.
 5. ImageCapture will now automatically select the already linked database in the retrieved list of databases. Leave this selection unchanged to update this database. The corresponding database name will then automatically be entered.
 6. Choose your preferred update method.
 7. Click on *OK* to perform the update.
- When the database has been updated, a confirmation will be displayed. Hereafter you can log in with the same credentials as used previously.

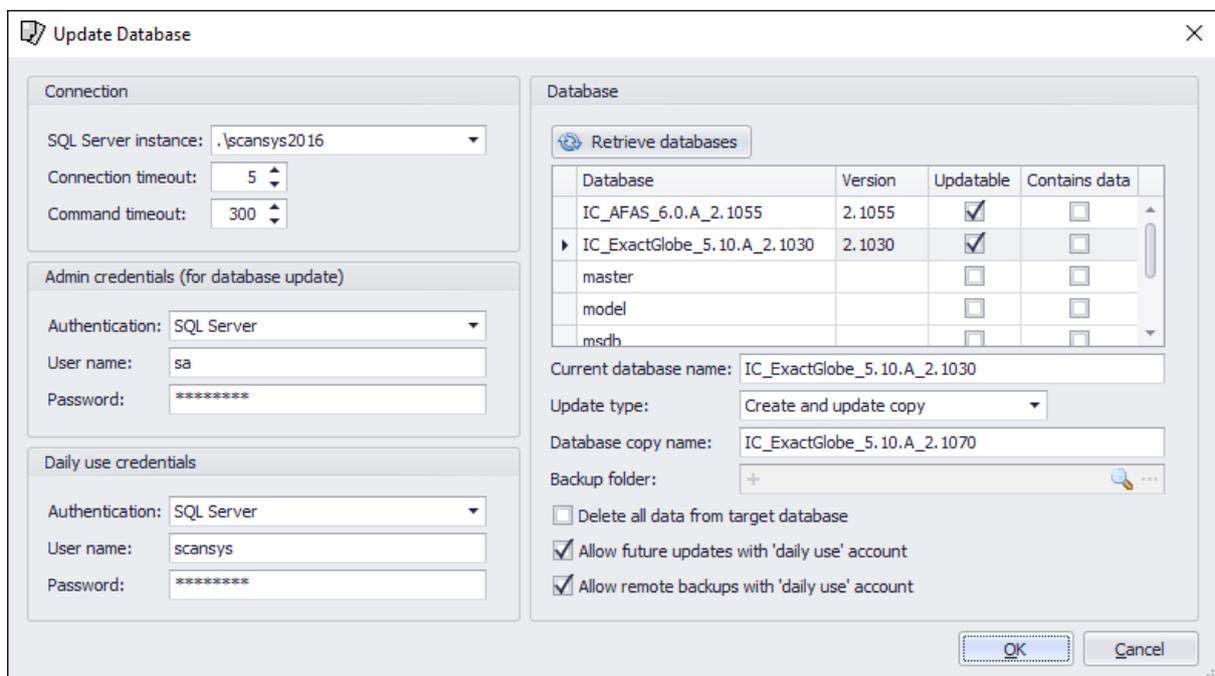


Figure 9.3: Updating database

Chapter 10

Client Service

Subjects in this chapter:

- Unattended processing.
- Client Service components.
- Distributing cores/licenses and sessions.
- Processing order of jobs and documents.

The Client Service processes documents and batches in ImageCapture unattended. The Client Service only processes documents for active, licensed classes that are not in use in a Manager. Within these classes, only licensed jobs are processed for which no user input is needed and for which the chosen ImageCapture user is authorized.

10.1 Components

The Client Service consists of three different executables, see also Figure 10.1:

- ClientService.exe
- ClientServiceProcess.exe
- ClientServiceWorker.exe

10.1.1 Service

The *Client Service* executable is the only one that is a Windows service. It starts the *Client Service Process* and ensures that it continues to run.

10.1.2 Process

The Process connects to the ImageCapture database and communicates with the License Service. In the Manager in *Tools* → *Options* → *Machine* the maximum number of *cores* that may be used on that system can be specified. The Process tries to acquire that number of cores/licenses from the License Service and launches a new *Client Service Worker* for each acquired license. The License Service distributes the available licenses efficiently across all connected systems and sends the actual number of licenses in the keep-alive signal back to the Process. Using this information, the Process scales the number of Workers up or down.

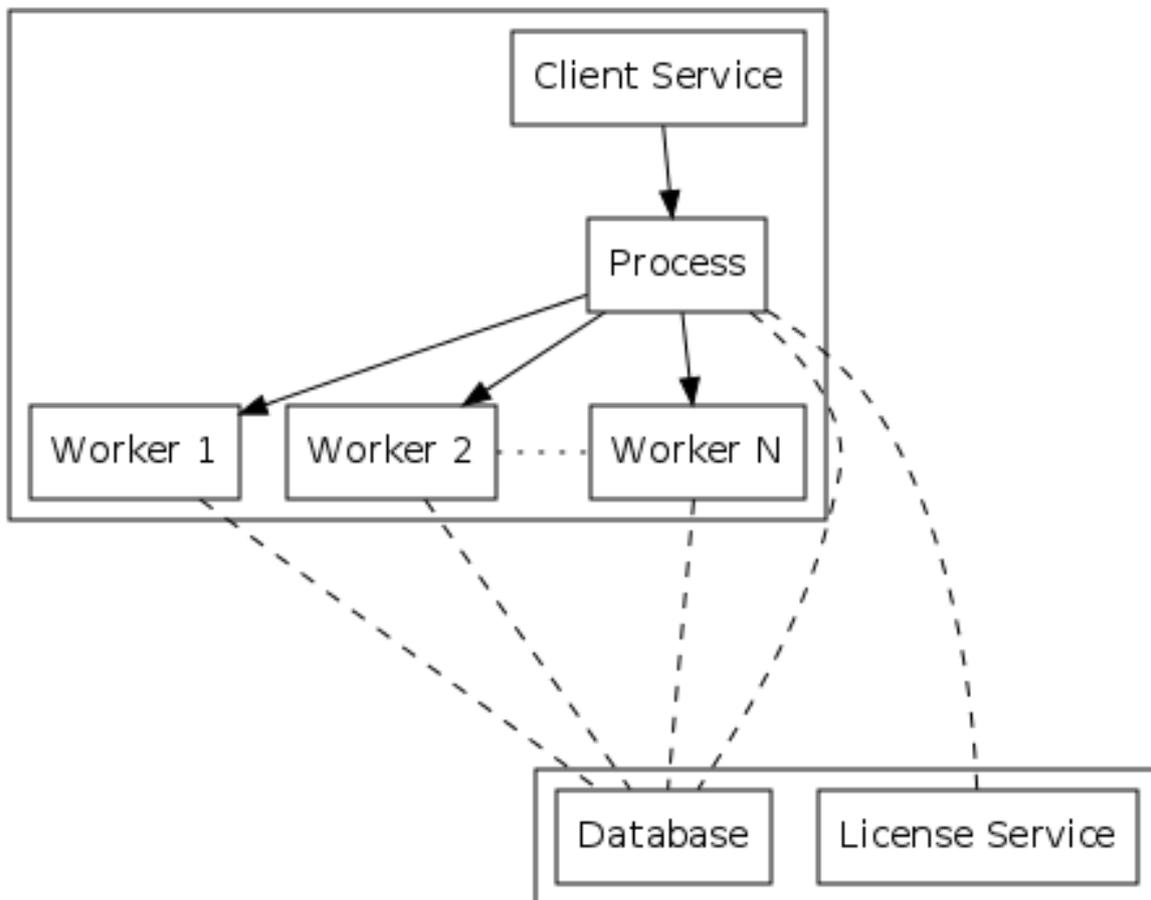


Figure 10.1: Client Service components

One system can run at most 8 Workers simultaneously, or at most the number of reported cores in that system. For a system with `hyperthreading`, Windows reports twice as many logical as physical cores when hyperthreading is enabled in the BIOS. On such a system with two physical cores (`dual-core`), 4 Workers are allowed to run. However, this hardly improves performance for configurations with a lot of processor-intensive operations, like OCR text recognition. In that case, a maximum of two physical cores should be configured in *Tools* → *Options*.

10.1.3 Worker

Each Worker is launched as a separate 32-bit process and does the actual processing of documents with a single core. Every Worker therefore has its own 1 GB of memory space.

A Worker runs with the goal to process documents through the entire process as efficiently as possible. Globally speaking, already imported documents are made available for user input as soon as possible and are then exported to the underlying applications as soon as possible. New files will only be imported when all existing documents have been processed completely or are waiting for user input. To achieve this, all jobs and documents are grouped and processed as follows:

- Jobs and documents are divided into the following priority groups:
 1. *Web Importers*.
 2. *Unattended jobs*, except for groups 3 en 4 and documents with status *Waiting* or *Errored*.
 3. *Import Jobs*, except for group 1.
 4. *Web Service Jobs* that synchronize all administrations.
 5. Identical to group 2, but now including documents with status *Waiting* or *Errored*.
- These groups are assembled over all classes to distribute the processing capacity evenly over all classes.
- The groups are always processed in the same order.
- If a group has actually processed something, processing continues at group 1.
- Within a group, after one minute, only the current document is finished.
- Within groups 2 and 5, at most 5 documents are processed per job.
- Within groups 2 and 5, a document is processed by as much consecutive unattended jobs as possible, without unlocking and reloading the document inbetween.

Individual documents are processed as follows:

- Documents with status *Waiting* are only processed again after at least 5 minutes.
- Documents with status *Errored* are only processed again after at least 5 minutes as well. Except in an *Export Job* if the option *Erroneous documents retry timeout (hours) in Client Service* is configured with an aberrant interval in the Manager. For example, a longer interval prevents documents from being sent to an external web services too often while it will become *Errored* again anyway because of a validation error.
- One system always executes at most one *Export Job* at a time, regardless of the number Workers that are running on that system. This limit is enforced because some exports do not work correctly when used from multiple processes simultaneously. The consequence is that exports are not processed multi-core.
- To prevent possibly increasing memory usage, a Worker always stops itself automatically every 12 hours, after which it is started again by the Process.

10.2 Sessions

When the Windows service is stopped, it ensures that its Process and all its Workers are also be stopped properly. A Worker also stops itself immediately when the process unexpectedly isn't running anymore. This can happen in case of connection problems with the ImageCapture database or License Service, or if the session is removed by an Admin user in Manager using *Tools* → *Session & Locks*..... The Process also stops itself immediately when the Windows service is no longer running.

When opening a class in the Manager, all Client Service sessions that are using that class are removed, so the Client Service does not need to be stopped manually when a class needs to be modified. Each Process and Worker will then shutdown automatically because its session was removed. The Client Service will then restart the Process, after which it will resume processing documents in all classes that are not in use in the Manager. When the class is closed in the Manager, the Client Service will resume processing that class in due time.

Part IV

Appendices

About this Document

This document is written in [Markdown](#)¹ and converted with [Pandoc](#)² and [LaTeX](#)³ to [PDF](#)⁴.

¹<http://daringfireball.net/projects/markdown>: “Markdown allows you to write using an easy-to-read, easy-to-write plain text format, then convert it to structurally valid XHTML.”

²<http://johnmacfarlane.net/pandoc>: “If you need to convert files from one markup format into another, pandoc is your swiss-army knife.”

³<http://www.latex-project.org>: “ \LaTeX is a high-quality typesetting system; it includes features designed for the production of technical and scientific documentation.”

⁴http://en.wikipedia.org/wiki/Portable_Document_Format: “Portable Document Format (PDF) is a file format used to present documents in a manner independent of application software, hardware and operating systems.”