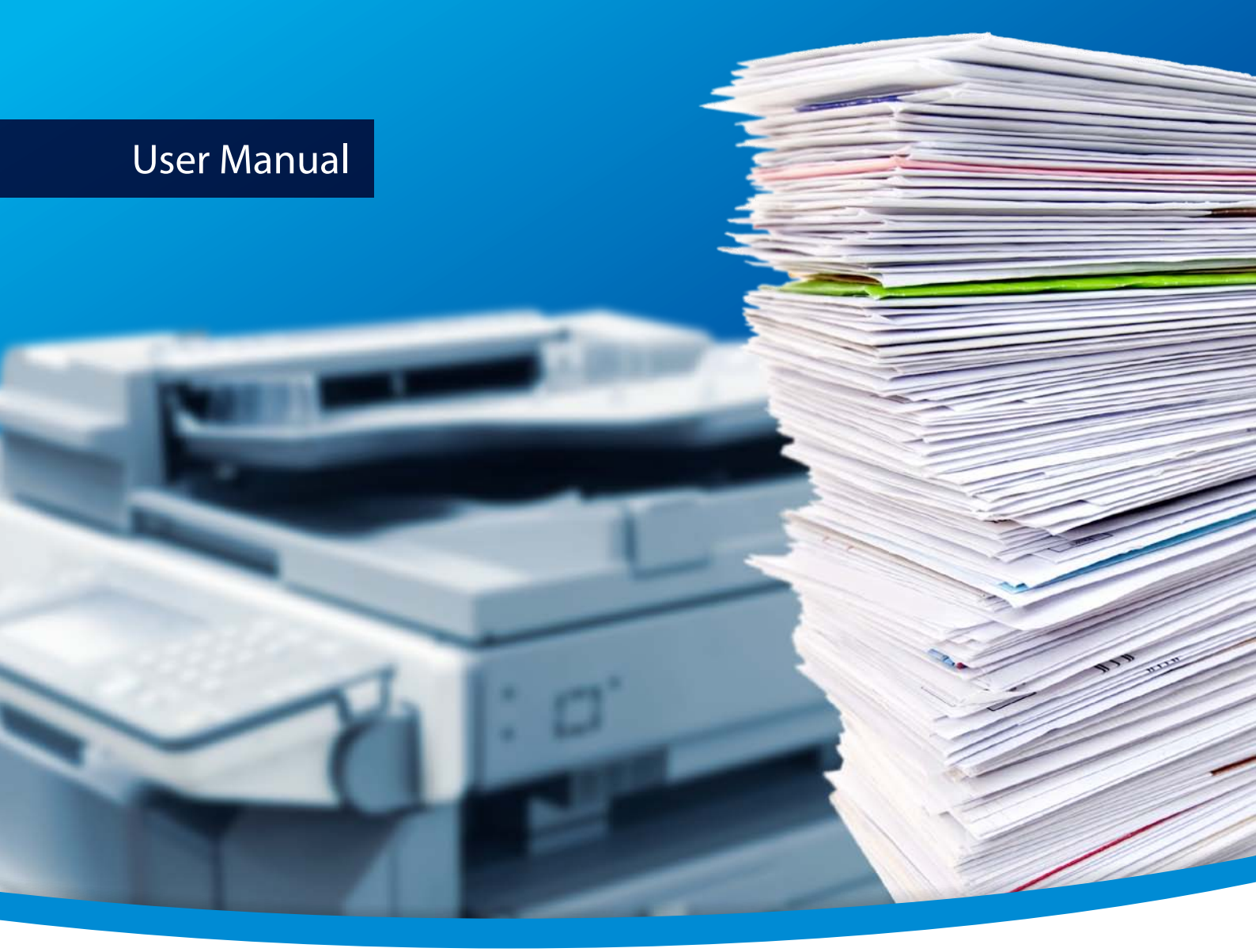
User Manual



3-Heights®
Scan to PDF Server

PDF/A conform

Version 6.27.2

PDF-TOOLS.COM
Premium PDF Technology

Contents

1 Introduction

1.1 Description

The 3-Heights® Scan to PDF Server is a service based application for scan post processing that is modular, flexible and highly parallel.

1.2 Functions

1.2.1 Features

- Conversion of single-page or multi-page raster images to PDF
- Processing of subfolders
- Flexible workflow configuration
- Set output format and conformity level (PDF, PDF/A-1, PDF/A-2 and PDF/A-3)
- Optical character recognition (OCR) including barcodes
- Digital PDF signature
- Parallel processing

Compression

- Set image compression individually different classes of images
- Support for mixed raster content (MRC)
- CCITT Group3 (1D and 2D)
- CCITT Group4
- LZW
- JPEG
- Deflate (ZIP)
- JPEG2000
- JBIG2 (lossless only)

1.2.2 Formats

Input formats

- JPEG
- TIFF
- scanned PDF

Output formats

- PDF 1.x (PDF 1.0, …, PDF 1.7)
- PDF 2.0
- PDF/A-1, PDF/A-2, PDF/A-3

1.2.3 Conformance

Standards:

- ISO 32000-1 (PDF 1.7)
- ISO 32000-2 (PDF 2.0)
- ISO 19005-1 (PDF/A-1)
- ISO 19005-2 (PDF/A-2)
- ISO 19005-3 (PDF/A-3)

1.3 Operating systems

The 3-Heights® Scan to PDF Server is available for the following operating systems:

- Windows Client 7+ | x86 and x64
- Windows Server 2008, 2008 R2, 2012, 2012 R2, 2016, 2019, 2022 | x86 and x64

'+' indicates the minimum supported version.

2 Installation

2.1 Preparation for OCR processing

The following products are necessary to use OCR processing:

2.1.1 ABBYY FineReader engine

The ABBYY FineReader Engine provides the actual OCR recognition.

Detailed installation instructions can be found in the following manuals:

- 3-Heights® OCR Add-on for ABBYY FineReader Engine v11: OcrAbbyy11.pdf
- 3-Heights® OCR Add-on for ABBYY FineReader Engine v12: OcrAbbyy12.pdf

The most important steps are:

1. Installation of the actual ABBYY FineReader Engine 11 or 12.
2. Activation of a valid license key for the ABBYY FineReader Engine in the ABBYY License-Manager.

2.1.2 3-Heights® OCR Service

The 3-Heights® OCR Service acts as a proxy between the 3-Heights® Scan to PDF Server and the ABBYY FineReader Engine.

Detailed installation instructions can be found in the following manual: OcrService.pdf

The most important steps are:

1. Installation of the 3-Heights® OCR Service.
2. Installation of a valid license for the 3-Heights® OCR Service.
3. Configuration of the 3-Heights® OCR Service in the OcrSvr.xml configuration file. Especially the default-plugin attribute must match the version of the ABBYY FineReader Engine.

2.2 Installation of the 3-Heights® Scan to PDF Server

To install the 3-Heights® Scan to PDF Server, simply run the MSI installer `Scan2PdfServer-‹version›-Windows.msi`.

2.2.1 Installed files

The following files are installed in `C:\Program Files (x86)\PDF Tools AG\3-Heights(TM) Scan to PDF Server`:

General files (required)

- `.\ScanServer.exe`
- `.\Scanserver.exe.config` (persistent)
- `.\ScanServer.xml` (persistent)
- `.\LicenseManager.exe`

TIFF processing support (optional)

- `.\tiffimp.exe`
- `.\tiffsplit.exe`
- `.\tiffmerge.exe`
- `.\tiffocr.exe`
- `.\tiffcompress.exe`
- `.\tiff2pdf.exe`
- `.\tiffextract.exe`

OCR processing support (optional)

- `.\pdfocrpluginService.ocr`
- `.\ocrserver.ini` (persistent)
- `.\pdfocrpluginAbbyy11.ocr`

PDF signing support (optional)

- `.\pdfsecure.exe`

2.3 Required licenses

The following licenses are necessary for the 3-Heights® Scan to PDF Server:

- 3-Heights® Scan to PDF Server
- 3-Heights® Image to PDF Converter Shell (for TIFF processing)
- 3-Heights® PDF Security Shell (for PDF signing)
- ABBYY FineReader Engine (for OCR processing only)
- 3-Heights® OCR Service (for OCR processing only)

2.4 Special directories

2.4.1 Directory for temporary files

This directory for temporary files is used for data specific to one instance of a program. The data is not shared between different invocations and is deleted after termination of the program.

The directory is determined as follows. The product checks for the existence of environment variables in the following order and uses the first path found:

Windows

1. The path specified by the `%TMP%` environment variable
2. The path specified by the `%TEMP%` environment variable
3. The path specified by the `%USERPROFILE%` environment variable
4. The Windows directory

2.4.2 Cache directory

The cache directory is used for data that is persistent and shared between different invocations of a program. The actual caches are created in subdirectories. The content of this directory can safely be deleted to clean all caches.

This directory should be writable by the application; otherwise, caches cannot be created or updated and performance degrades significantly.

Windows

- If the user has a profile:
  `%LOCAL_APPDATA%\PDF Tools AG\Caches`
- If the user has no profile:
  `<TempDirectory>\PDF Tools AG\Caches`

where `<TempDirectory>` refers to the Directory for temporary files.

2.4.3 Font directories

The location of the font directories depends on the operating system. Font directories are traversed recursively in the order as specified below.

If two fonts with the same name are found, the latter one takes precedence, i.e. user fonts always take precedence over system fonts.

Windows

1. `%SystemRoot%\Fonts`
2. User fonts listed in the registry key `\HKEY_CURRENT_USER\Software\Microsoft\Windows NT\CurrentVersion\Fonts`. This includes user specific fonts from `C:\Users\<user>\AppData\Local\Microsoft\Windows\Fonts` and app specific fonts from `C:\Program Files\WindowsApps`
3. `Fonts` directory, which must be a direct subdirectory of where `SCSE.exe` resides.

3 License management

The 3-Heights® Scan to PDF Server requires a valid license in order to run correctly.

More information about license management is available in the license key technote.

4 Configuration

4.1 Application configuration

The application configuration can be changed in the file `ScanServer.exe.config` inside the installation directory, but the default configuration is usually sufficient.

The application configuration is very simple and provides only the following properties:

4.1.1 Configuration

Property (get, set): `String Configuration`
Default: `"ScanServer.xml"`

Path to the process definition file. The path is evaluated relative to the application configuration file.

4.1.2 ConfigurationLog

Property (get, set): `String ConfigurationLog`
Default: `"configuration.log"`

Path to the configuration log file. The path is evaluated relative to the application configuration file.

This file is written if an error occurs while starting the service. After the service startup, logging is defined by the Process definition file.

4.2 Process definition

The process definition file is usually called `ScanServer.xml` and located in the installation directory. However, the name and location can be overridden in the Application configuration file.

The process definition consists of so-called components. Every component provides a certain functionality and also defines how it is configured.

All components are explained in detail in the Component reference. The main/root component has always the type and name ScanServer.Root.

A list of complete examples is provided in the Cook book.

5 Component reference

5.1 Main components

5.1.1 ScanServer.Root

This is the main component in the Scan to PDF Server product.

XML configuration structure

`<Workfolder>` The folder for temporary files.

- **`path`** The path to the workfolder.

`<Logging>` A component of type Log.Container defining the logging facility. This setting can be overridden by specific Groups.

`<Group>` (**1..n**) A group for processing similar files.

- **`<InputFolder>`** The watched folder for the input files.
  - **`path`** The path to the folder.
  - **`filter`** (**optional**) A pattern for filtering filenames.
  - **`folders`** (**optional**) If `"true"`, The input folder is scanned for folders instead of files.
    Default value: `"false"`.
  - **`trigger`** (**optional**) If `folders="true"`, this denotes a pattern of files inside a folder, that will trigger the processing of the containing folder.
  - **`lock-files`** (**optional**) If `"true"`, the files in the input directory are locked during the entire process to prevent them from being modified or removed.
    Default value: `"false"`.

    > **Note:** This option should not be set to `"true"` for bulk processing of many input files at once, as the process might run out of file handles.

- **`<OutputFolder>`** The output folder for the resulting files in case of success.
  - **`path`** The path to the folder.
  - **`suffix`** (**optional**) Suffix used for name conflict resolution. The placeholder `{0}` is replaced by an automatic index number.
    Default value is `" ({0})"`
  - **`append-suffix`**
    - **`"never"`** Suffix is never appended. Name conflicts result in an error.
    - **`"always"`** Suffix is always appended.
    - **`"auto"`** (**default**) Suffix is only appended in case of naming conflicts

- **`<FailedFolder>`** The output folder for the original files in case of an error.
  - **`path`** The path to the folder.

<Logging> (**optional**) A component of type Log.Container overriding the global setting.

<Processing> The processing pipeline, a component of type Composition.Linear. Input item type must be `IFile`. Output item type can be either `IFile` or `IList<IFile>`.

Example:

```
<ScanServer.Root>
    <Workfolder path="C:\Scan Server\Workfolder"/>
    <Logging>
        <!-- Logging configuration is omitted here -->
    </Logging>
    <Group>
        <InputFolder path="C:\Scan Server\Input" filter="*.tif"/>
        <OutputFolder path="C:\Scan Server\Output"
                      suffix=".{0}" append-suffix="auto"/>
        <FailedFolder path="C:\Scan Server\Failed"/>
        <Logging>
            <!-- Logging configuration is omitted here -->
        </Logging>
        <Processing>
            <!-- Processing configuration is omitted here -->
        </Processing>
    </Group>
    <Group>
        <!-- Another group -->
    </Group>
    <!-- More groups -->
</ScanServer.Root>
```

5.2 Composition of components

Components from the namespace `Composition` provide functionality for combining other Components.

5.2.1 Loading subcomponents

If some component can have subcomponents of **arbitrary type**, there must be some a mechanism to specify this type.

There are two variants to specify the type of a component:

Short hand form

For components defined in the Scan Server itself, the type can be specified in the element name like:

```
<Namespace.Type>
```

This is a short hand for general form:

```
<... c:type="ScanSolution.Components.Namespace.Type">
```

General form

Components can be loaded from a different .NET assembly by using the .NET fully qualified name:

```
<... xmlns:c="http://www.pdf-tools.com/scanserver/composition/container"
     c:type="Namespace1.Namespace2.Type, AssemblyName">
```

Namespace form

If many components from the same assembly are used, the namespace form comes handy.

On the root XML element (`<ScanServer.Root>`) a mapping from XML namespaces to .NET namespaces can be defined:

```
<ScanServer.Root
    xmlns:c="http://www.pdf-tools.com/scanserver/composition/container"
    xmlns:pl="http://www.example.com/plugin"
    c:ns="http://www.example.com/plugin Example.Namespace, ExampleAssembly">
```

This can later be referenced like:

```
<pl:PluginComponent>
```

Example:

This example combines two components operating on a file into a new custom component, also operating on a file:

```
<!-- Components from the Scan Server application with short form
-    ========================================================== -->
<Tiff.Ocr>
    <!-- OCR configuration is omitted here -->
</Tiff.Ocr>
<Tiff.Compress>
    <!-- Compression configuration is omitted here -->
</Tiff.Compress>
<Log.File>
    <!-- Log file configuration is omitted here -->
</Log.File>

<!-- Same components in general form (Element name is not important)
-    ============================================================== -->
<TiffOcr c:type="ScanSolution.Components.Tiff.Ocr">
    <!-- OCR configuration is omitted here -->
</TiffOcr>
<TiffCompress c:type="ScanSolution.Components.Tiff.Compress">
    <!-- Compression configuration is omitted here -->
</TiffCompress>
<LogFile c:type="ScanSolution.Components.Log.File">
    <!-- Log file configuration is omitted here -->
</LogFile>

<!-- Plugin component
-    ================ -->
<Custom c:type="CustomPlugin.CustomNamespace.CustomComponent, CustomPlugin">
```

```
    <!-- Configuration of custom component is omitted here -->
</Custom>
```

5.2.2 Composition.Linear

This component provides functionality for chaining together multiple components.

It takes a list of components and connects the output of each component with the input of the next component in the chain. The input of the composed component is the input of the first component, the output is taken from the last component. The type of the component is determined according to chapter Loading subcomponents.

The item types of the subcomponents will be inferred. If the types do not match, the configuration is rejected.

Input item type

The input item type is the same as the input item type of the first subcomponent.

Output item type

The output item type is the same as the output item type of the last subcomponent.

XML configuration structure

`<...>` (**1..n**) Subcomponent, see Loading subcomponents.

Example: This example combines two components operating on a file into a new custom component, also operating on a file.

```
<Composition.Linear>
    <Tiff.Ocr>
        <!-- OCR configuration is omitted here -->
    </Tiff.Ocr>
    <Tiff.Compress>
        <!-- Compression configuration is omitted here -->
    </Tiff.Compress>
</Composition.Linear>
```

5.3 List processing

The components from the `List` namespace provide functionality for parallel processing of a list of items.

5.3.1 List.Map

With the `List.Map` component, an operation can be applied to a list of items in parallel. The result is again a list of items.

The content of that component is itself a component of type Composition.Linear.

XML configuration structure

See Composition.Linear.

Example: This example is the same as in Composition.Linear, but instead of operating on a single file, it operates on a list of files.

```
<List.Map>
    <Tiff.Ocr>
        <!-- OCR configuration is omitted here -->
    </Tiff.Ocr>
    <Tiff.Compress>
        <!-- Compression configuration is omitted here -->
    </Tiff.Compress>
</List.Map>
```

5.3.2 List.Filter

This component provides functionality for filtering a list of items. The content is again a component of type Composition.Linear, with the restriction that the output type must be a `IBool`.

Input item type

`IList<TItem>` where `TItem` can be any type of item.

Output item type

`IList<TItem>` (Same type as input item)

XML configuration structure

See Composition.Linear.

Example: Example for filtering out empty files with a custom plugin.

```
<List.Filter>
    <Empty c:type="CustomPlugin.IsEmptyFile, CustomPlugin">
        <!-- Configuration of custom component is omitted here -->
    </Empty>
    <Bool.Not/>
</List.Filter>
```

5.3.3 List.SortBy

Sort the list by a dynamically computed key.
The content is again a component of type Composition.Linear, with the restriction that the output type must be a `IString`.

Input item type

`IList<TItem>` where `TItem` can be any type of item.

Output item type

`IList<TItem>` (Same type as input item)

XML configuration structure

See Composition.Linear.
Additional Attributes:

`comparison` The string comparison type:

- **`"current-culture"`** **(Default)** Compare strings using culture-sensitive sort rules and the current culture.
- **`"current-culture ignore-case"`** Compare strings using culture-sensitive sort rules, the current culture, and ignoring the case of the strings being compared.
- **`"invariant-culture"`** Compare strings using culture-sensitive sort rules and the invariant culture.
- **`"invariant-culture ignore-case"`** Compare strings using culture-sensitive sort rules, the invariant culture, and ignoring the case of the strings being compared.
- **`"ordinal"`** Compare strings using ordinal (binary) sort rules.
- **`"ordinal ignore-case"`** Compare strings using ordinal (binary) sort rules and ignoring the case of the strings being compared.
- **`"logical"`** Compare strings using logical sort rules and ignoring the case of the strings being compared. Digits in the strings are considered as numerical content rather than text. The result can differ between different version of Microsoft Windows. It should not be used for canonical sorting applications. This is the sort rule used by the Windows Explorer.

Example: Sort the files in a list in the same order as Windows Explorer.

```
<List.SortBy comparison="logical">
    <File.Name/>
</List.SortBy>
```

5.3.4 List.ChunkIf

This component provides functionality for splitting a list of items into chunks. The content is again a component of type Composition.Linear, with the restriction that the output type must be a `IBool`.

If the inner pipeline for an element returns `true`, then the list is split before that element.

Input item type

`IList<TItem>` where `TItem` can be any type of item.

Output item type

`IList<IList<TItem>>` where `TItem` is the same type as `TItem` of the input item type.

XML configuration structure

See Composition.Linear.

Example: Example for splitting by barcode using a custom plugin.

```
<List.ChunkIf>
    <Barcode c:type="CustomPlugin.ContainsBarcode, CustomPlugin">
        <!-- Configuration of custom component is omitted here -->
    </Barcode>
</List.ChunkIf>
```

5.3.5 List.Join

Join a nested list into an unnested list.

This component performs the inverse functionality of List.ChunkIf.

Input item type

`IList<IList<TItem>>` where `TItem` can be any type of item.

Output item type

`IList<TItem>` where `TItem` is the same type as `TItem` of the input item type.

Example: Split a list of TIFFs into pages and concatenate all pages into a single list.

```
<Folder.Files filter="*.tif"/>
<List.Map>
    <Tiff.SplitPages/>
</List.Map>
<List.Join/>
```

5.3.6 List.IsEmpty

Check if a list is empty.

Input item type

`IList<IItem>` (A list of items of any kind)

Output item type

`IBool`

XML configuration structure

This component has no properties that can be configured.

Example:

```
<List.IsEmpty/>
```

5.3.7 List.ElementAt

Extract a single element from a list.

Input item type

`IList<TItem>` (A list of items of a speficic type)

Output item type

`TItem` (A single item of the same specific type)

XML configuration structure

`index` The index of the element to be extracted (starting with `0`).

Example:

```
<List.ElementAt index="0"/>
```

5.4 TIFF processing

The components from the `Tiff` namespace provide functionality for processing TIFF files.

5.4.1 Tiff.ImportImage

The `Tiff.ImportImage` imports the image data from other file formats into a TIFF file, if possible without changing or recompressing the image data.

Supported file formats

- **JPEG File Interchange Format** (*.jpg, *.jpeg, *.jpe)
- **PDF** (*.pdf): Supported are only PDFs as they are typically produced by scan stations, i.e. only PDFs that contain a single image and nothing else.

Input item type

The input item type of this component is `IFile`.

Ouput item type

The output item type of this component is `IFile`.

XML configuration structure

`default-resolution` The image resolution in DPI, if not already defined in the image.

Example:

```
<Tiff.ImportImage default-resolution="96"/>
```

5.4.2 Tiff.SplitPages

The `Tiff.SplitPages` component splits a TIFF file into a list of TIFF files, each containing only one page of the input file.

Input item type

The input item type of this component is `IFile`.

Ouput item type

The output item type of this component is `IList<IFile>`.

XML configuration structure

This component has no properties that can be configured.

Example:

```
<Tiff.SplitPages/>
```

5.4.3 Tiff.Merge

The `Tiff.Merge` component merges a list of TIFF files into a single TIFF file.

Input item type

The input item type of this component is `IList<IFile>`.

Ouput item type

The output item type of this component is `IFile`.

XML configuration structure

remove-blank-pages Set `remove-blank-pages="true"` to remove blank pages previously recognized by the Tiff.Ocr component. Default value is `remove-blank-pages="false"`.

Example:

```
<Tiff.Merge/>
```

5.4.4 Tiff.Ocr

This component analyzes the TIFF and stores additional information in the file. This information can later be used by other components:

- Recognized text can be used by the Tiff.ConvertToPdf component to generate a text layer in the PDF.
- Recognized barcodes can be used to split the document. See example Splitting a TIFF by barcode for more details.
- Recognized picture regions can be used by the Tiff.Compress component to improve the MRC compression result.
- Recognized mask image can be used by the Tiff.Compress component to improve the MRC compression result.

Input item type

The input item type of this component is `IFile`.

Ouput item type

The output item type of this component is `IFile`.

XML configuration structure

plugin The OCR plugin used for recognition.
Possible values: See Available OCR plugins

parameters The parameters that are passed to the plugin.
The format of the value is plugin-specific.

languages The languages that are passed to the plugin.
The format of the value is plugin-specific.

binarize Set `binarize="true"` if the image should be converted to black/white before processing.
Default value is `binarize="false"`.

max-parallel Limit the number of concurrent OCR tasks.
Default value is `max-parallel="-1"` (unlimited).

Available OCR plugins

OCR engines are accessed through the corresponding OCR plugins. At present the following OCR plugins are supported:

"internal" **Internal Image Analysis Engine**

The internal engine can only recognize the following element:

- Picture regions.
  Use OCR parameter `RecognizePictures=true` to enable.
- Mask image.
  Use OCR parameter `DisableMaskEmbedding=true` to disable.
- Blank pages.
  Use OCR parameter `RecognizeBlankPages=true` to enable.

Note: Text recognition is **not** supported by this engine.

`"service"` **3-Heights® OCR Service**

Access one of the supported OCR engines over a proxy service.

The service point can be specfied directly as `"service@http://hostname:7982/"` or by editing the configuration file `ocrserver.ini`.
See the manual of the **3-Heights® OCR Service** for more details.

`"abbyy11"` **Abbyy FineReader 11 OCR Engine**

`"abbyy10"` **Abbyy FineReader 10 OCR Engine**

Example:

```
<Tiff.Ocr plugin="service"
          languages="German,English"
          parameters="PredefinedProfile=DocumentConversion_Accuracy"/>
```

5.4.5 Tiff.ExtractOcrData

Extract the OCR data that was previously embedded by Tiff.Ocr.

The extracted information is a list of XML files, one for each page of the TIFF. The XML format is defined in Appendix A. To be forward compatible with future versions, it is strongly recommended to use the `format-version` attribute.

Input item type

The input item type of this component is a TIFF file (`IFile`).

Ouput item type

The output item type of this component is a list of XML files (`IList<IFile>`), one for each page of the TIFF.

XML configuration structure

`format-version` The version of the XML format.
Possible values: `"1"`, `"2"`, `"3"` or `"4"`. Default: As stored in the TIFF (no reformatting).

Example:

```
<Tiff.ExtractOcrData/>
```

5.4.6 Tiff.Compress

Provides functionality for compressing a TIFF file and perform MRC segmentation.

XML configuration structure

recompress-lossy Recompress JPEG, JPEG2000 and JBIG2 streams.
Default value: `recompress-lossy="true"`

upgrade-jpeg Upgrade from JPEG 6 to JPEG (Technote 2).

<Bilevel-Compression> Compression settings used for bilevel (black/white) images.

- **type** Compression type (Possible values see below)
- **quality** Compression quality for lossy compression (1..100)

Grayscale-Compression Compression settings used for grayscale images.

- **type** Compression type (Possible values see below)
- **quality** Compression quality for lossy compression (1..100)

<Lab-Compression> Compression settings used for images in the CIE L*a*b* color space.

- **type** Compression type (Possible values see below)
- **quality** Compression quality for lossy compression (1..100)

<Paletted-Compression> Compression settings used for images with a color palette.

- **type** Compression type (Possible values see below)
- **quality** Compression quality for lossy compression (1..100)

<RGB-Compression> Compression settings used for RGB (and YCbCr) images.

- **type** Compression type (Possible values see below)
- **quality** Compression quality for lossy compression (1..100)

<Separated-Compression> Compression settings used for images in a separated color space (including CMYK).

- **type** Compression type (Possible values see below)
- **quality** Compression quality for lossy compression (1..100)

<MRC> Mixed raster content settings

- **segmentation** If `segmentation="true"`, mixed raster content segmentation is performed.
- **mask-threshold** Binarization threshold for MRC segmentation.
  Default: automatic
- **<MaskFill-Compression>** Compression of the fill image of the background and foreground layer.
  - **type** Compression type (Possible values see below)
  - **quality** Compression quality for lossy compression (1..100)
  - **scale** Reduce the resolution by a factor.

Compression types

The following values are possible for the `type` attribute on `<XXX-Compression>` elements:

"raw" Uncompressed

"group3" CCITT Group 3 Fax Compression

"group3-2d" CCITT Group 3 (2D) Fax Compression

"group4" CCITT Group 4 Fax Compression

"lzw" LZW Compression (GIF)

"jpeg" JPEG (Technote 2) Compression

"jpeg6" JPEG 6 Compression

"deflate-adobe" Adobe Deflate Compression

"packbits" Packbits Compression

"deflate" Deflate Compression (ZIP)

"jpeg2000" JPEG 2000 Compression

"jbig2" JBIG 2 Compression (lossless only)

Example:

```
<Tiff.Compress upgrade-jpeg="true"
               recompress-lossy="false">
    <Bilevel-Compession type="group4"/>
    <Grayscale-Compression type="jpeg" quality="90"/>
    <RGB-Compression type="jpeg" quality="75"/>
    <MRC segmentation="true">
        <MaskFill-Compression type="jpeg" quality="20" scale="2"/>
    </MRC>
</Tiff.Compress>
```

5.4.7 Tiff.ConvertToPdf

Provides functionality for converting a list of TIFF files into a PDF document.

XML configuration structure

compliance The conformance level of the generated PDF.
Supported values are:

"pdf1.x" Regular PDF Versions such as 1.4, 1.5, 1.6, 1.7

"pdf2.0" Regular PDF Version 2.0

"pdfa-1b" PDF/A-1b format

"pdfa-1a" PDF/A-1a format (accessibility)

"pdfa-2b" PDF/A-2b format

"pdfa-2u" PDF/A-2u format (unicode)

"pdfa-2a" PDF/A-2a format (accessibility)

"pdfa-3b" PDF/A-3b format

"pdfa-3u" PDF/A-3u format (unicode)

"pdfa-3a" PDF/A-3a format (accessibility)

default-resolution The image resolution in DPI, if not defined in the image. (Default: 96)

user-unit The user unit in multiples of points.

mrc-layers Create optional content groups (PDF layers) for MRC layers.
Default: `"false"`

ocr-text Create PDF text from embedded OCR information.
Default: `"true"`

output-intent-path Path to the desired output intent profile.
Example: `"C:\Windows\System32\spool\drivers\color\sRGB Color Space Profile.icm"`

fallback-color-profile-path Path to the desired fallback color profile. This profile is used for TIFFs without embedded color profile.
Example: `"C:\Windows\System32\spool\drivers\color\sRGB Color Space Profile.icm"`

xmp-path Path to the desired XMP metadata file.

Example:

```
<Tiff.ConvertToPdf mrc-layers="true"/>
```

5.5 PDF processing

5.5.1 Pdf.Sign

Sign a PDF document.

A detailed description of all options is provided by the manual of the 3-Heights® PDF Security Shell Tool.

Input item type

The input item type of this component is `IFile`.

Ouput item type

The output item type of this component is `IFile`.

XML configuration structure

provider The cryptographic provider used to sign the document.

store The name of the certificate store (Microsoft CryptoAPI provider only)

location The location of the certificate store (Microsoft CryptoAPI provider only)

<SessionProperty> (**1..n**) Generic, provider specific session properties

- **name** The name of the property
- **type** The type of the property. Possible types are `"string"` and `"file"`
- **value** The value of the property

<TimeStamp> The timestamp server configuration

url The URL of the timestamp server

credentials The credentials for accesssing the timestamp server.

<WebProxy> The web proxy server configuration

url The URL of the web proxy server

credentials The credentials for accessing the web proxy server.

<Certificate> Certificate selection

name The (proper) name of the certificate (**"Issued to"**)

issuer The issuer of the certificate (**"Issued by"**)

serial The serial number of the certificate

fingerprint The certificate fingerprint

<Signature>

reason The signature reason

contact-info Contact info of the signer

<Appearance>

page The page number of the signature appearance

bounding-box The bounding box of the signature appearance

<Border> The border appearance

color The color of the border (color name or #RRGGBB)

width The line width of the border

<Background> The border appearance

color The color of the background (color name or #RRGGBB)

image Path to the background image

<Text1> The first text line The inner text of this element is used as first line

font The name of the font or path to the font file.

<Text1> The second text line The inner text of this element is used as second line

font The name of the font or path to the font file.

Example:

```
<Pdf.Sign>
    <TimeStamp url="http://tsa.swisssign.net"/>
    <Certificate name="Hans Muster"
                 issuer="Example CA"/>
    <Signature reason="I'm the author of this document"
               contact-info="Please do not contact me">
        <Appearance>
            <Border color="blue" width="10"/>
            <Background color="#FF0000"/>
            <Text1 font="CourierNew">I signed this document</Text1>
            <Text2 font="Helvetica">I'm the author</Text2>
```

```
        </Appearance>
    </Signature>
</Pdf.Sign>
```

5.6 XML processing

5.6.1 Xml.Parse

Parse an XML file for further processing.

Input item type

The input item type of this component is `IFile`.

Ouput item type

The output item type of this component is an XML node (`XmlNode`).

XML configuration structure

This component has no properties that can be configured.

Example:

```
<Xml.Parse/>
```

5.6.2 XPath.Select

Select XML nodes with an XPath expression.

Input item type

The input item type of this component is `XmlNode`.

Ouput item type

The output item type of this component is a list of XML nodes (`IList<XmlNode>`).

XML configuration structure

This component contains the XPath-Expression as text.

Namespaces can be declared on the element itself.

Example: Select all barcode nodes in an OCR-XML

```
<XPath.Select xmlns:ocr="http://www.pdf-tools.com/ocr">
    //ocr:page/ocr:page-content/ocr:barcode
</XPath.Select>
```

5.7 Logging

Components from the namespace Log provide logging functionality.

5.7.1 Reporting level

All logging components have a property called `reporting-level`, that specifies which type of log entries are actually logged.

Possible values are:

`"error"` Errors only.

`"warning"` Warnings and errors.

`"info"` All types.

5.7.2 Log.Container

The `Log.Container` component bundles different logging facilities.

Log entries are routed to all subcomponents in parallel.

XML configuration structure

`reporting-level` See Reporting level.

`details` If `"true"`, additional information is logged for each log entry (if available).
The default value is `"false"`.

`<...>` (**1..n**) Logging subcomponents, see Loading subcomponents.

Example:

```
<Log.Container reporting-level="warning">
    <LogFile>
        <!-- Log file configuration is omitted here -->
    </LogFile>
    <EventLog>
        <!-- Windows event log configuration is omitted here -->
    </EventLog>
</Log.Container>
```

5.7.3 LogFile

The `LogFile` component provides the functionality to log into a file.

XML configuration structure

`reporting-level` See Reporting level.

`details` If `"true"`, additional information is logged for each log entry (if available). The default value is `"false"`.

`path` The path to the logfile. If the path contains the character sequence `{0}`, this sequence is replaced with an integer number on every startup, to make the logfile unique.

Example:

```
<LogFile reporting-level="warning" path="C:\Scan Server\log-{0}.txt"/>
```

5.7.4 EventLog

The `EventLog` component provides the functionality to log to the Windows event log.

XML configuration structure

`reporting-level` See Reporting level.

`source` The event log source.

Example:

```
<EventLog reporting-level="warning" source="ScanServer"/>
```

5.8 File system

Components that deal with folders, files and file names.

5.8.1 File.Name

Get the filename of a file.

Input item type

The input item type of this component is `IFile`.

Ouput item type

The output item type of this component is `IString`.

XML configuration structure

extension Specify, whether the file extension is included.
The default value is "true".

Example:

```
<File.Name extension="false"/>
```

5.8.2 Folder.Files

Get the files contained in a folder

Input item type

The input item type of this component is IFolder.

Ouput item type

The output item type of this component is IList<IFile>.

XML configuration structure

filter Filter the by filename using wildcards (*, ?). The filter expression is case-insensitive.
Multiple filters can be specified separated by a semicolon (;).

regex Filter the by filename using a regular expression (.NET style). The filter expression is case-insensitive.

> **Note:** If both, filter and regex are specified, regex takes precedence.

Example:

```
<Folder.Files filter="*.tif;*.jpg"/>
```

5.8.3 FileList.AppendSuffix

Rename a list of files, allowing to use the index in the list.

XML configuration structure

The configuration contains the suffix as text. The string {0} is replaced by the index of the file in the list.

Example:

```
<FileList.AppendSuffix>_{0}</FileList.AppendSuffix>
```

5.9 Boolean logic

Components that deal with boolean logic.

5.9.1 Bool.Not

Invert a boolean value.

XML configuration structure

This component cannot be configured further.

Example:

```
<Bool.Not/>
```

5.10 Complete example

```
<ScanServer>
    <Workfolder path="C:\Scan Server\Workfolder"/>
    <Logging>
        <LogFile path="C:\Scan Server\log-{0}.txt" reporting-level="warning"/>
        <EventLog source="ScanServer" reporting-level="info"/>
    </Logging>
    <!-- Compress TIFF input
-        ================== -->
    <Group>
        <InputFolder path="C:\Scan Server\CompressTiff\Input" filter="*.tif"/>
        <OutputFolder path="C:\Scan Server\CompressTiff\Output"/>
        <FailedFolder path="C:\Scan Server\CompressTiff\Failed"/>
        <Processing>
            <Tiff.SplitPages/>
            <List.Map>
                <Tiff.Compress upgrade-jpeg="true" recompress-lossy="false">
                    <Bilevel-Compession type="group4"/>
                    <Grayscale-Compression type="jpeg" quality="90"/>
```

```
                    <RGB-Compression type="jpeg" quality="75"/>
                </Tiff.Compress>
            </List.Map>
            <Tiff.Merge/>
        </Processing>
    </Group>
    <!-- Create mixed raster content PDF from TIFF
-        ========================================= -->
    <Group>
        <InputFolder path="C:\Scan Server\Tiff2MrcPdf\Input" filter="*.tif"/>
        <OutputFolder path="C:\Scan Server\Tiff2MrcPdf\Output"/>
        <FailedFolder path="C:\Scan Server\Tiff2MrcPdf\Failed"/>
        <Processing>
            <Tiff.SplitPages/>
            <List.Map>
                <Tiff.Ocr plugin="service" languages="German,English"/>
                <Tiff.Compress upgrade-jpeg="true" recompress-lossy="false">
                    <Bilevel-Compession type="group4"/>
                    <Grayscale-Compression type="jpeg" quality="90"/>
                    <RGB-Compression type="jpeg" quality="75"/>
                    <MRC segmentation="true">
                        <MaskFill-Compression quality="20" scale="2"/>
                    </MRC>
                </Tiff.Compress>
            </List.Map>
            <Tiff.ConvertToPdf/>
        </Processing>
    </Group>
    <!-- Convert JPEG image to compressed TIFF
-        ====================================
-        Since JPEG doesn't allow multiple pages,
-        there is no per-page parallelization in this case -->
    <Group>
        <InputFolder path="C:\Scan Server\CompressJpeg\Input" filter="*.jpeg"/>
        <OutputFolder path="C:\Scan Server\CompressJpeg\Output"/>
        <FailedFolder path="C:\Scan Server\CompressJpeg\Failed"/>
        <Processing>
            <Tiff.ImportImage/>
            <Tiff.Compress upgrade-jpeg="true" recompress-lossy="false">
                <Bilevel-Compession type="group4"/>
                <Grayscale-Compression type="jpeg" quality="90"/>
                <RGB-Compression type="jpeg" quality="75"/>
            </Tiff.Compress>
        </Processing>
    </Group>
</ScanServer>
```

6 Cook book

6.1 Splitting a TIFF by barcode

Whenever a specific barcode containing the text "SpLiT" appears on a page, the document is split into parts.

Configuration

```
<Processing>
    <Tiff.SplitPages/>
    <List.ChunkIf>
        <Tiff.Ocr plugin="service"
                  parameters="PredefinedProfile=BarcodeRecognition_Accuracy"
                  max-parallel="4"/>
        <Tiff.ExtractOcrData/>
        <List.ElementAt index="0"/>
        <Xml.Parse/>
        <XPath.Select xmlns:ocr="http://www.pdf-tools.com/ocr">
            //ocr:barcode[text()="SpLiT"]
        </XPath.Select>
        <List.IsEmpty/>
        <Bool.Not/>
    </List.ChunkIf>
    <List.Map>
        <Tiff.Merge/>
    </List.Map>
    <FileList.AppendSuffix>_{0}</FileList.AppendSuffix>
</Processing>
```

Explaining the details

1. The multi-page TIFF file is split into a list of single-page TIFFs.
2. For each of the single-page TIFFs it is determined, if it contains the required barcode by:
   a. Perform OCR on the TIFF using a profile suited for barcode recognition. The recognized content is embedded into the TIFF.
   b. The recognized content is extracted from the TIFF.
   c. Since a TIFF can potentially contain multiple pages, we only use the content of the first page (we know that it's only one page in this context)
   d. With an XPath expression, a list of barcode elements is extracted from the content.
   e. If this list is not empty, that means that the page contains the required barcode.
3. The list of single-page TIFFs is split into sub-lists, whenever a page contains the required subpage.
4. Each sublist is again merged into a multi-page TIFF.
5. The files are renamed, such that the file names contain an index.

6.2 Merge a folder of TIFF files into a single PDF

Scan the input folder for subfolders that are processed as a whole as soon as a text file is dropped into the subfolder. The conversion includes OCR processing and compression.

Configuration

```
<ScanServer>
    <Workfolder path="C:\ScanServer\Workfolder"/>
    <Group>
        <InputFolder path="C:\ScanServer\Input" folders="true"
                                                trigger="*.txt"/>
        <OutputFolder path="C:\ScanServer\Output"/>
        <FailedFolder path="C:\ScanServer\Failed"/>

        <Processing>
            <Folder.Files filter="*.tif"/>
            <List.SortBy comparison="logical">
                <File.Name/>
            </List.SortBy>
            <List.Map>
                <Tiff.SplitPages/>
                <List.Map>
                    <Tiff.Ocr plugin="service@http://localhost:7982/"/>
                    <Tiff.Compress>
                        <Bilevel-Compression type="Group4"/>
                        <Grayscale-Compression type="JPEG" quality="75"/>
                        <RGB-Compression type="JPEG" quality="75"/>
                    </Tiff.Compress>
                </List.Map>
            </List.Map>
            <List.Join/>
            <Tiff.ConvertToPdf/>
        </Processing>
    </Group>
</ScanServer>
```

Explaining the details

1. The input folder is scanned for folders, the processing of a subfolder is started as soon as a .txt file is found in the subfolder.
2. The files with extension .tif are extracted from the subfolder.
3. The list of files is sorted by name, using the logical ordering (same as Windows Explorer).
4. Each file is processed separately:
   a. The file is split into one TIFF file per page and each page is again processed separately:
      - OCR is performed using the OCR service on the same machine.
      - The page is compressed using different compression algorithms for different image types.
5. The nested list is joined into a single list of TIFF files (one per page).
6. The list of TIFFs is then converted into a single PDF.

7 Version history

7.1 Changes in versions 6.19–6.27

- **Update** license agreement to version 2.9

7.2 Changes in versions 6.13–6.18

No functional changes.

7.3 Changes in versions 6.1–6.12

- **Improved** search algorithm for installed fonts: User fonts under Windows are now also taken into account.

Component `Tiff.ExtractOcrData`

- **Improved** OCR XML format. Maximum version increased to 4.

7.4 Changes in version 5

- **New** additional supported operating system: Windows Server 2019.
- **Changed** behavior when reading a TIFF. The value `Relative` from tag `ResolutionUnit` is now interpreted as `Inch`.

7.5 Changes in version 4.12

- **New** HTTP proxy setting in the GUI license manager.
- **Introduced** license features `TiffProcessing` and `PdfSignature`.

Component `Tiff.ExtractOcrData`

- **New** attribute `format-version` to produce a fixed version of the OCR XML format.

7.6 Changes in version 4.11

- **New** support for reading and writing PDF 2.0 documents.
- **New** support for the creation of output files larger than 10GB (not PDF/A-1).

- **Improved** search in installed font collection to also find fonts by other names than TrueType or PostScript names.
- **Improved** font subsetting of CFF and OpenType fonts.

Component `ScanServer.Root`

- **New** attribute `lock-files` on `<InputFolder>` element to configure whether input files are locked during processing.
  - **Changed** the default value from `"true"` to `"false"`.

Component `Tiff.ExtractOcrData`

- **Changed** OCR XML format (version 3)

7.7 Changes in version 4.10

Component `Tiff.Merge`

- **New** attribute `remove-blank-pages="true"` to remove pages without content.

7.8 Changes in version 4.9

- **New** support for OpenType font collections in installed font collection.
- **Improved** metadata generation for standard PDF properties.

Component `Tiff.ConvertToPdf`

- **New** attribute `xmp-path` to add XMP metadata to the PDF.
- **New** attribute `fallback-color-profile-path` to specify a color profile for TIFFs that have none embedded.

Component `Folder.Files`

- **Changed** attribute `filter`: The attribute now accepts multiple filter strings separated by semicolon.
- **New** attribute `regex` to filter filenames by a regular expression.

7.9 Changes in version 4.8

- **New** feature: Merge files from an input subfolder
- **New** component: `<List.SortBy>` to sort a list of items.
- **New** component: `<List.Join>` to flatten nested lists of items.

- **New** component: `<File.Name>` to get the name of a file.
- **New** component: `<Folder.Files>` to extract the content of a folder.

Component `ScanServer.Group`

- **New** attribute `<InputFolder folders="...">` to scan the input folder for subfolders.
- **New** attribute `<InputFolder trigger="...">` to specify a trigger file.

8 Licensing, copyright, and contact

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A OCR XML format

A.1 Versions

The XML format has evolved over time and will continue to do so. Incompatible changes are denoted by increasing the format version. The current version is 4.

If applicable, the minimum format version of attributes or child elements is specified in parentheses.

The addition of new optional attributes is not considered an incompatible change. Applications that consume the XML must therefore be prepared to ignore unknown attributes.

A.2 Elements

A.2.1 <document> Element

The root element of the XML.

This element is omitted if the XML is describing a single page only. In that case, the <page> element is the root element.

Attributes:

`version` (**optional** in v1, **required** otherwise) The version of the XML format.

Default value is `"1"`.

Child elements:

<page> (**1..n**)

A.2.2 <page> Element

A single page that represents the recognized image.

Attributes:

`version` (**optional**) The version of the XML format.

If no version is specified, the value is inherited from the parent <document> element, if present. Default value is `"1"`.

`bb` The bounding box of the page in pixels: `"0 0 w h"`

`res` The resolution of the image.

Child elements:

<page-content> (**1**)

A.2.3 <page-content> Element

The root element of the page content.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v1:
<image> (**0..n**), <text> (**0..n**),

Child elements v2:
<image> (**0..n**), <barcode> (**0..n**) <text> (**0..n**),

Child elements v3:
 (**0..n**), <image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <heading> (**0..n**), <paragraph> (**0..n**), <text> (**0..n**),

Child elements v4:
<header> (**1**), <footer> (**1**), <section> (**0..n**), <incut-group> (**0..n**), <incut> (**0..n**), <footnote> (**0..n**), <image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <text-block> (**0..n**),

A.2.4 <header> Element

The page header.

Attributes:
tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:
<image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <text-block> (**0..n**),

A.2.5 <footer> Element

The page footer.

Attributes:
tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:
<image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <text-block> (**0..n**),

A.2.6 <section> Element

A page section.

Attributes:
tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:
<incut-group> (**0..n**), <incut> (**0..n**), <footnote> (**0..n**), <image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <text-block> (**0..n**),

A.2.7 <artifact> Element

Content elements that cannot be classified.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:

<image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <text-block> (**0..n**),

A.2.8 <incut-group> Element

A group of incuts.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:

<incut> (**0..n**),

A.2.9 <incut> Element

An incut.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:

<image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <text-block> (**0..n**),

A.2.10 <footnote> Element

A footnote.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:

<image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <text-block> (**0..n**),

A.2.11 Element

A generic group of content elements.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v3:

<text> (**0..n**), (**0..n**), <heading> (**0..n**), <paragraph> (**0..n**), <table> (**0..n**), <image> (**0..n**), <barcode> (**0..n**)

A.2.12 <caption> Element

The caption of an image or table.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:

<image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <text-block> (**0..n**),

A.2.13 <text-block> Element

A block of text.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:

<list> (**0..n**), <heading> (**0..n**), <paragraph> (**0..n**), <word> (**0..n**), <text> (**0..n**),

A.2.14 <list> Element

A list.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:

<item> (**0..n**),

A.2.15 <item> Element

An item in a list.

Attributes:

tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:

<list> (**0..n**), <heading> (**0..n**), <paragraph> (**0..n**), <word> (**0..n**), <text> (**0..n**),

A.2.16 <heading> Element

A text heading.

Attributes:

tf (**optional**), bb (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v1-v3:
<text> (**0..n**)

Child elements v4:
<word> (**0..n**) <text> (**0..n**),

A.2.17 <paragraph> Element

A text paragraph.

Attributes:
tf (**optional**), bb (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v1-v3:
<text> (**0..n**)

Child elements v4:
<word> (**0..n**) <text> (**0..n**),

A.2.18 <word> Element

A single word.

Attributes:
tf (**optional**), bb (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v4:
<text> (**0..n**),

A.2.19 <text> Element

A text fragment.

The base line of the text is determined by the line $y = 0$ in the transformed coordinate system. Usually, the transformation looks like `tf="1 0 0 1 x y"`, where (x, y) is the baseline position of the first character.

The baseline and the bounding box are not necessarily intersecting.

> **Note:** In version 1 of the format, barcodes are represented by <text> elements with `font-name="Barcode"` or `font-name="BarcodeHex"`.

Attributes:
tf (**required**), bb (**required**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**),

suspicious-chars (**optional**) The zero based indexes of all suspicious characters, separated by a space. If the attribute is empty, there are no suspicious characters.

If the attribute is missing, the information is unknown.

char-left-pos (**optional**) The position of the left border of each character, separated by a space. The position is measured on the baseline starting from the left border.

If the attribute is missing, the information is unknown.

`char-right-pos` (**optional**) The position of the right border of each character, separated by a space. The position is measured on the baseline starting from the left border.

If the attribute is missing, the information is unknown.

Text content:
The text content of the text fragment as plain text.

A.2.20 <table> Element

A table.

Attributes: tf (**optional**), font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements v1-v3:
<row> (**0..n**)

Child elements v4:
<row> (**0..n**) <caption> (**0..n**)

A.2.21 <row> Element

A table row.

Attributes: font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

Child elements:
<cell> (**0..n**)

A.2.22 <cell> Element

A table cell.

Attributes:
font-name (**optional**), font-family (**optional**), font-styles (**optional**), font-size (**optional**), locale (**optional**)

`type` (**optional**) The cell type.

`"data"` (Default) A data cell.

`"heading"` A header cell.

Child elements v3:
<text> (**0..n**), (**0..n**), <heading> (**0..n**), <paragraph> (**0..n**), <table> (**0..n**), <image> (**0..n**), <barcode> (**0..n**)

Child elements v4:
<image> (**0..n**), <barcode> (**0..n**) <table> (**0..n**), <text-block> (**0..n**),

A.2.23 <image> Element

An image.

Attributes:

tf (**optional**), bb (**optional**),

type (**optional**) The image type.

"raster" (Default) A raster picture.

"vector" A vector graphic.

Child elements v4:

<caption> (**0..n**)

A.2.24 <barcode> Element

An 1D or 2D barcode.

> **Note:** In version 1 of the format, barcodes are represented by <text> elements with font-name="Barcode" or font-name="BarcodeHex".

Attributes:

tf (**optional**), bb (**optional**),

encoding (**optional**) The encoding of the barcode value.

"hex" Encoded as a hexadecimal string.

Text content:

The barcode value as plain text or in the specified encoding.

A.3 Common attributes

A.3.1 tf Attribute

The coordinate transformation matrix of the element.

tf="m11 m12 m21 m22 dx dy"

The transformation matrix is specified by six numbers. All information about orientation, rotation, scaling, skewing and translation can be calculated based on these six numbers.

The actual matrix is $M = \begin{bmatrix} m11 & m12 & 0 \\ m21 & m22 & 0 \\ dx & dy & 1 \end{bmatrix}$

This matrix is used to define a transformation of a vector $[\, x\ y\ 1\,]$ to a vector $\begin{bmatrix} x'\ y'\ 1 \end{bmatrix} = [\, x\ y\ 1\,] \cdot M$, where (x, y) is the original point and (x', y') is the transformed point on the page.

A.3.2 bb Attribute

The bounding box of the element in the transformed coordinate system.

bb="x y w h"

If the element also contains the tf attribute, the transformation is applied, before the bounding box is computed.

A.3.3 font-name Attribute

The name of the font used for <text> elements.

The attribute is inheritable, i.e. it can occur on any parent element of the text, down to the <page-content>.

A.3.4 font-family Attribute

The family of the font used for <text> elements, separated by a space.

Possible values are:

"mono" A monospaced font, i.e. every character has the same width. An example of such a font is "Courier".

"sans" A font without serifs (sans serif). An example of such a font is "Arial".

"serif" A font with serifs. An example of such a font is "Times".

The attribute is inheritable, i.e. it can occur on any parent element of the text, down to the <page-content>.

A.3.5 font-styles Attribute

The list of styles of the font used for <text> elements, separated by a space.

Possible values are:

"bold"

"italic"

"underline"

"strikeout"

The attribute is inheritable, i.e. it can occur on any parent element of the text, down to the <page-content>.

A.3.6 font-size Attribute

The size the font used for <text> elements.

The attribute is inheritable, i.e. it can occur on any parent element of the text, down to the <page-content>.

A.3.7 locale Attribute

The locale of <text> elements in ISO format.

The attribute is inheritable, i.e. it can occur on any parent element of the text, down to the <page-content>.

A.4 Example

```
<?xml version="1.0" encoding="utf-8"?>
<page xmlns="http://www.pdf-tools.com/ocr" version="3" bb="0 0 2481 3508" res="300 300">
  <page-content font-name="Times New Roman" font-family="serif" font-styles=""
                font-size="13" locale="en-US">
    <div font-styles="bold" font-size="18">
      <heading bb="297 314 1879 381">
        <text tf="1 0 0 1 297 366" bb="0 -51 146 0" suspicious-chars=""
              char-left-pos="0 48 84 118" char-right-pos="41 80 112 146">Face</text>
      </heading>
      <paragraph bb="296 623 2110 727" font-size="12" font-styles="">
        <text tf="1 0 0 1 430 658" bb="0 -33 122 11" suspicious-chars=""
             char-left-pos="0 16 55 78 103" char-right-pos="14 54 74 100 122">Image</text>
        <text tf="1 0 0 1 568 658" bb="0 -35 87 11" suspicious-chars=""
              char-left-pos="0 25 45 71" char-right-pos="23 44 70 87">days</text>
      </paragraph>
    </div>
    <table font-name="Arial" font-family="sans" font-size="10">
      <row>
        <cell>
          <paragraph bb="299 1042 458 1071">
            <text tf="1 0 0 1 299 1071" bb="0 -29 76 0" suspicious-chars="1 2"
                  char-left-pos="0 20 32 46 63"
                  char-right-pos="15 24 43 60 76">First</text>
          </paragraph>
        </cell>
        <cell>
          <paragraph bb="935 1040 1138 1071">
            <text tf="1 0 0 1 935 1071" bb="0 -29 78 0" suspicious-chars=""
                  char-left-pos="0 25 58" char-right-pos="22 54 78">Two</text>
          </paragraph>
        </cell>
      </row>
      <row>
        <cell>
          <paragraph bb="297 1098 513 1129">
            <text tf="1 0 0 1 297 1129" bb="0 -31 131 0" suspicious-chars=""
                  char-left-pos="0 21 44 63 89 112"
                  char-right-pos="17 40 60 83 107 131">Second</text>
          </paragraph>
        </cell>
        <cell>
          <paragraph bb="937 1098 1217 1129">
            <text tf="1 0 0 1 937 1129" bb="0 -31 131 0" suspicious-chars=""
                  char-left-pos="0 21 44 64 89 112"
                  char-right-pos="17 40 60 84 107 131">Second</text>
          </paragraph>
        </cell>
      </row>
    </table>
    <image bb="293 1305 651 1767" type="raster"/>
    <barcode bb="514 1982 858 2057">0123456789</barcode>
  </page-content>
</page>
```