4-Heights™
Conversion Service

Version 2.2.0

PDF-TOOLS.COM
Premium PDF Technology
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1 Introduction

1.1 Description

The 4-Heights™ Conversion Service is an all-round carefree package for automating your document processes. It takes input documents of different formats from various sources and processes them according to your use case to produce high-quality PDF/A documents.

1.2 How It Works

The 4-Heights™ Conversion Service can be thought of as a factory with a production line (workflow) for each product it offers. The products it manufactures are documents prepared for a specific use case. For example, the workflow Archiving PDF/A-2 is engineered specifically for preparing documents for archiving.
A production line consists of a series of processing steps (e.g. validate, OCR, convert, merge, sign, . . .), each of which moves the raw materials (input documents) closer to being a finished product (output document).

Some steps are optional and most of them have options (e.g. paper size, image resolution, . . .). These can be adjusted to your individual needs by configuring one or more setups (profiles) for each production line. A profile defines which processing steps to activate and what options to use.

### 1.3 Processing Documents

If you want the factory to manufacture a product (output document), you send them an order (job) consisting of the raw materials (input documents), the production line (workflow) and setup (profile) to use and where to deliver the finished product (output path).

**Input**

Similarly, to prepare documents for a specific use case, you send a job consisting of the following input to the 4-Heights™ Conversion Service:

- **Input Documents** The documents to be processed.
- **Workflow Name** Which workflow to use, i.e. the use case to prepare the documents for.
- **Profile Name** Which profile to use, i.e. how the documents should be processed.
- **Output Path** Where to store the resulting document.

**Output**

Once conversion is completed, the 4-Heights™ Conversion Service returns:

- **Output Document** If the conversion was successful, the resulting document can be found in the specified output directory.
- **Report** Conversion events, warnings and errors. Useful for analysis.

### 1.4 Integration Options

The communication with the factory can happen through different channels. Maybe you send the order by mail. Or you bring everything to the factory in person. Similarly, the 4-Heights™ Conversion Service offers different interfaces to communicate through.

The 4-Heights™ Conversion Service is a Windows service designed to be installed on a server and integrated into your system using one of the following interfaces:
**Watched Folder**  Automatically convert documents copied to a pre-configured input folder to a pre-configured output folder. Recommended for integrating with file share architectures. Suited for interactive and manually triggered processing.

**Shell Client**  Easy to use shell tool. Recommended for integrating using scripts. Suited for automated and manually triggered processing.

**REST API**  Easy to use webservice interface. Recommended for integrating into your existing application (Enterprise Application Integration). Suited for automated and manually triggered processing from within your application.

**GUI Client**  Easy to use graphical tool. Recommended for testing and familiarizing yourself with the 4-Heights™ Conversion Service. Suited for manually triggered processing only.

### 1.5 Functions

#### 1.5.1 Features

- Validate & repair PDF documents
- Convert to PDF/A
- Optimize
  - Reduce file size
  - Remove unnecessary information
- Make documents searchable through OCR
1.5.2 Formats

Supported input formats:

- **Document formats**
  - PDF 1.x, 2.0
  - PDF/A-1, PDF/A-2, PDF/A-3
- **Other formats**
  - ZIP (without password protection)
  - Email: EML, MSG (without encryption)
  - Word: DOC, DOT, DOCX, DOCM, DOTX, DOTM, RTF
  - Excel: XLS, XLT, XLSX, XLSM, XLTX, XLTM
  - PowerPoint: PPT, PPS, PPTX, PPTM, PPSX, PPSM
  - TXT
- **Image formats**
  - JPEG, JPEG2000
  - TIFF
  - BMP
  - GIF
  - JBIG2
  - PNG

1.5.3 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)

1.6 Operating Systems

The 4-Heights™ Conversion Service is available for the following operating systems:

- Windows Server 2016, 2019 | x64

1.7 Compatible Microsoft Office Versions

As an optionally available feature Word, Excel and PowerPoint documents can be converted to PDF with the 4-Heights™ Conversion Service. The conversion of Word, Excel and PowerPoint documents requires a Microsoft Office installation on the same server where the Conversion Service is running. Compatible Microsoft Office versions are:

- Office 2016 (64 Bit)
- Office 2019 (64 Bit)
- Office 365 (64 Bit), see **Considerations when using Office 365**

US English is the recommended and supported language setting.
2 Quick Start Guide

The setup is simple: you just install the 4-Heights™ Conversion Service on your server and you are all set for your first conversion.

2.1 Installation

1. Download and install the required .NET runtimes:
   1. .NET Framework 4.7
   2. Microsoft Windows Desktop Runtime 3.1 (x64)
   3. Microsoft ASP.NET Core Runtime 3.1 (x64)
2. Download and execute the MSI installation package and follow the instructions on screen. This will install the following components:
   - Conversion Service
   - Configurator GUI
   - Shell and GUI Clients
   - License Manager
   - Watched Folder
3. Add your license in the license manager as described in chapter License Management.

   Note: To convert Word, Excel and PowerPoint documents, an Office User must be configured, as described in Office Configuration. Also, Office conversion must be activated in the profile, e.g. using the Configurator GUI as described in Profile Configuration.

2.2 Convert your first file using the preinstalled configuration

1. Copy a document, e.g. input.pdf, to the server you just installed the service on.
2. Open a command prompt and type

   ```
   pdfclient -v input.pdf output.pdf
   ```

3. The client will show the conversion progress and when it is finished you will find the newly generated output.pdf in the current working directory.

2.3 Configure for your scenario

- Configure your service as described in Service Configuration.
- Adapt the default profile or create new ones as described in Profile Configuration.

2.4 Integrate into your system

Choose your integration:
- Shell Client pdfclient
- Watched Folder
- REST API
3 License Management

The 4-Heights™ Conversion Service requires a valid license in order to run correctly. More information about license management is available in the license key technote.
4 Workflows

4.1 Archiving PDF/A-2

This workflow is engineered specifically for preparing documents for archiving. It processes all input documents of a job as follows:

Analyze Filetype

- In a first step, the documents are analyzed. If the filetype of any document is unsupported, conversion is aborted. Otherwise, they are sent to the next processing step depending on their filetype.

Convert to PDF

- Office to PDF

Validate

Repair

OCR

Convert to PDF/A

Merge / Collect

Optimize

Sign
Validate & Repair (Quality Assurance)  To ensure document quality, PDF and PDF/A documents are validated. If a corruption is detected, the 4-Heights™ Conversion Service attempts to repair it.

Convert to PDF  Non-PDF documents (e.g. images, Office documents, ...) are converted to PDF if their format is supported by the 4-Heights™ Conversion Service.

Note: the conversion of Office documents requires an additional step which can only be enabled with an appropriate license.

OCR  In order to make the resulting document searchable, OCR is performed on documents that require it. The recognized text is stored directly in the PDF.

Note: this is an optional step and can only be enabled with an appropriate license.

Convert to PDF/A  PDF documents that are not already PDF/A-2 conforming are converted to a high-quality PDF/A-2.

Merge / Collect  The converted documents of a job are merged or collected into one document, depending on the profile setting.

Optimize  The resulting document is optimized for archiving. This includes several optimizations: redundant and unnecessary data for archiving is removed, images are compressed intelligently and fonts are merged and subset.

Note: this is an optional step and can only be enabled with an appropriate license.

Sign  The resulting document is digitally signed using the signature settings in the selected profile.

Note: this is an optional step and can only be enabled with an appropriate license.

4.2 Processing Steps

4.2.1 Office Conversion

The conversion of Word, Excel and PowerPoint documents to PDF requires an installation of Microsoft Office (see Compatible Microsoft Office Versions) on the same server where the Conversion Service is installed. The Conversion Service runs and interacts with Microsoft Office Applications with a dedicated user account. We refer to this user account as the Office User. To convert Word, Excel and PowerPoint documents with the 4-Heights™ Conversion Service you need to configure the Office User. Please follow the steps described in Office Configuration.

Processing

Prior to the PDF conversion, embedded documents from Office documents in Open XML format (e.g. DOCX, XLSX, PPTX) are extracted in a destructuring step. Thereafter the documents are converted to PDF by using Microsoft Word, Excel and PowerPoint. Quality is the reason why we use Office Applications for this processing step, because the layout and resemblance of the resulting PDF and the original document is high. This is especially true, if the document was created with the same version of Microsoft Office, which is installed on the server with the Conversion Service.

If a document contains macro instructions, these are disabled before opening the document because of security concerns. During conversion CPU and memory usage of Word, Excel and PowerPoint processes are monitored by the Conversion Service.

User parameters (e.g. Ignore Embedded Files, Layout settings such as Fit Page Width, etc) to control the Office to PDF conversion are not yet available. With regard to performance, the parallel execution of Word and Excel Applications is currently limited to four and to one for PowerPoint. Furthermore, the extraction of embedded files from documents in classic Office formats (e.g. DOC, XLS, PPT) or from password protected Office documents is not supported. Finally, parallel operation of the 4-Heights™ Conversion Service and the 3-Heights™ Document Converter on the same server is not recommended because the Office configurations of the two services interfere with each other, see Office Conversion Problems.
5 User’s Guide

This section gives an overview of the usage and configuration of the 4-Heights™ Conversion Service features and interfaces.

5.1 Service Configuration

The service can be configured using the 4-Heights™ Conversion Service Configurator GUI, which is added to the Windows start menu during installation.

Service configuration tab of the 4-Heights™ Conversion Service Configurator

Status

Shows the status of the 4-Heights™ Conversion Service and provides the controls to start, stop and restart the Windows service.

For the 4-Heights™ Conversion Service to be “running”, the Windows service must be started and its configuration must be valid.

If the 4-Heights™ Conversion Service is not operable even though the Windows service has been started, check the log file for more information on the cause. Common problems are a missing license or low disk space.

Note that whenever the configuration is changed, the Windows service must be restarted for the changes to take effect. When the service is stopped, all current jobs are canceled and deleted.

The Windows service is installed with service name ConversionService and display name “4-Heights™ Conversion Service”. So its status can also be changed using Windows’ “Services” desktop app or the sc command line program.

Service Host Address

The address of the service host of the form http://<hostname>:<port>/conversion/v1.0/rest.

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Default: http://localhost:13033/conversion/v1.0/rest

It is recommended to not change the address, unless the default port 13033 is already in use on the local machine. If the port is changed and firewall rules have been added, they must be changed accordingly.

The configured service host address is also the endpoint URL used by the Shell Client pdfclient or REST API.

Windows Defender Rules Exclude the service processses and working directories from monitoring by the Windows Defender Antivirus. It is highly recommended to enable this setting, because the service might otherwise be slowed down significantly.

Open Port The port configured in the Service Host Address is by default available from the local machine only. If the 4-Heights™ Conversion Service should be accessible from other machines, e.g. using the Shell Client pdfclient or REST API, the port must be opened in the Windows Firewall.

This switch opens the port for connections from all other computers. If more specific rules are required, they must be created manually (see chapter Security Considerations).

Temporary Files The directory where temporary files are written to. To optimize performance, this directory should be on a local drive with fast read and write access.

Proxy Configuration of the proxy url to be used for all http and https communication to external hosts. The option can either be left empty for no proxy or must be a string with the following syntax:

http[s]://[<user>:<password>@]<host>[:<port>]

Where:
- <user>:<password> (optional): Credentials for connection to proxy (basic authorization).
- <host>: Hostname of proxy.
- <port>: Port for connection to proxy.

Office User Configure the dedicated user account required for Word, Excel and PowerPoint to PDF Conversion. Click on Configure and follow the on-screen instructions, further details are explained in Office Configuration.

Log Directory The directory where all log files are written to. This includes the logs of the service (see Service Log) and the Watched Folder.

5.2 Profile Configuration

Profiles are managed using the 4-Heights™ Conversion Service Configurator GUI, which is added to the Windows start menu during installation.
Profiles tab of the 4-Heights™ Conversion Service Configurator

Profiles

A profile defines all options and optional processing steps for a given workflow, see Workflows. Each workflow is delivered with a default profile called “default”. To add and configure a new profile click the Add Profile button. To edit an existing profile simply click on it.
**Import Profiles** Click **Import Profiles** in the top-right menu to import profiles from a profile configuration file. If a profile with the same name is selected in the same workflow as an already existing profile, a dialog with the following options appears:

- **Deselect duplicates**: Select this option if you only want to add, but not replace any existing profiles.
- **Replace originals with imported profiles**: Select this option if you want to replace the existing profiles.
- **Keep originals and imported profiles**: Select this option if you want to keep both, the existing and the imported profiles.
Export Profiles  Click Export Profiles in the top-right menu to export one or more profiles to a profile configuration file.

Configure a new profile with the 4-Heights™ Conversion Service Configurator

Name  Enter the desired name for the profile.
Default  Check this box to set the current profile as the default profile for the given workflow.

Processing Steps  Enable/disable optional processing steps. Corresponding options will be displayed accordingly.

Options  Set options for individual processing steps. You can find a summary for each option in its tooltip. For a detailed explanation of the options, click on the title of the corresponding section to open the documentation panel.

Any configuration change requires a restart of the Conversion Service in order for it to take effect. When you add or edit profiles, the Configurator detects changes and displays an unobtrusive notification. For your convenience, your changes are kept in memory, until you click Save & Restart Service in the notification.

5.3  Office Configuration

The 4-Heights™ Conversion Service uses Microsoft Office Applications to convert Word, Excel and PowerPoint documents to PDF. A dedicated user account is necessary to run and interact with Microsoft Office Applications. We refer to this user as the Office User.

5.3.1  Office User Configuration

1. Open the Configurator
2. Navigate to the Service configuration tab of the 4-Heights™ Conversion Service Configurator
3. Click on Office User and configure one of the following two options:
   - Let the Conversion Service create a new local user
   - Use an existing domain user

Let the Conversion Service create a new local user

In this case the Conversion Service creates and configures a local user account ConversrOfficeUser automatically.

   - The account does not have any group memberships.
   - A complex random password with 36 characters is created and encrypted using the Windows Data Protection API. The password does not expire.
   - The "Log on as a batch job" Security Policy Setting is granted to this user.
   - The Registry and DCOM Permissions of Word, Excel and PowerPoint are adjusted.

Use an existing domain user

In this case you need to provide an existing domain user account. The account is not managed by the configurator. The following properties and settings are set automatically.

   - The password is encrypted using the Windows Data Protection API before it is stored to a configuration file1.
   - The "Log on as a batch job" Security Policy Setting is granted to this user.
   - The Registry and DCOM Permissions of Word, Excel and PowerPoint are adjusted.

---

1 If you update the password you need to reconfigure the Office User
5.3.2 Considerations when using Office 365

We recommend to use Office 2016 or Office 2019 over Office 365 because the license activation requires additional steps. These steps must be configured manually and demand to use an existing domain user as the Office User. The additional steps for using Office 365 are as follows.

1. Create a domain user or use an existing domain user account and verify that this user can log in to the server where the Conversion Service is installed.
2. Assign an Office 365 license to this user.
3. Install the Microsoft Office applications on the server.
4. Activate: log in to the server with the dedicated domain user account and open one of the applications, e.g. Microsoft Word, accept the license agreement and follow the on-screen instructions. Close the application afterwards.
5. Log in to the server as admin and configure the Office User of the Conversion Service as described in section Office User Configuration.

5.3.3 Microsoft Office License Considerations

The 4-Heights™ Conversion Service uses Microsoft Office applications to process jobs containing Word, Excel and PowerPoint documents. For compliance with the licensing guidelines from Microsoft, it is required that every client sending jobs with Word, Excel or PowerPoint documents to the Conversion Service is licensed for Microsoft Office.

5.4 Watched Folder

Watched Folders are directories that are under surveillance of a dedicated service, the Watched Folder Service. The Watched Folder Service periodically polls the content of a local shared input folder. If a new document is detected, the Watched Folder Service creates a new job and sends it to the 4-Heights™ Conversion Service. A Watched Folder is a convenient way to realize automated processing with the 4-Heights™ Conversion Service, by copying documents into the input folder and retrieving the result from the dedicated output folder.

5.4.1 Configuration

A Watched Folder consists of a set of three directories: an Input, an Output and a Failed folder. We refer to this set as Watched Folder Group. Several Watched Folder Groups can be configured and used simultaneously. Watched Folder Groups can currently only be configured by manually editing the XML file Folders.xml inside the installation directory.

Configuration examples can be found inside the Folders.xml configuration file. The default configuration uses the "Archive PDF/A-2" Workflow and the "default" Profile. Further, the default configuration uses the recursive option, i.e. if a directory is copied or moved to the watched folder, all documents inside subdirectories are sent to the 4-Heights™ Conversion Service. The path of the Watched Folder Group of the default configuration is C:\Conversion Service\Archive PDF-A-2.

5.4.2 Usage

Once a Watched Folder Group is configured, it is straight-forward to use. Input files can be moved or copied to the Input folder, processing will start immediately and automatically. After completion, the resulting output documents can be retrieved from the Output folder. If an error occurs the input files are moved to the Failed folder. In

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2 See "Add new employee" documentation from Microsoft, last accessed November 2020
3 See "Install Office" documentation from Microsoft, last accessed November 2020
4 For further details we refer to the Documentation from Microsoft, last accessed November 2020
case of an error more information on its cause can be found in the log file ConversionService-Folders.log located in the log directory configured in the Service Configuration.

5.5 Shell Client pdfclient

The shell client application called pdfclient interacts with the 4-Heights™ Conversion Service via the REST API. The application creates jobs based on its input parameters. The jobs are then uploaded in parallel to the 4-Heights™ Conversion Service and the shell client monitors the completion, before the output files are downloaded. In verbose mode (option -v), a detailed report including all performed actions on the documents is written to the console. In case warnings or errors occurred during processing, they are reported as well.

A selection of examples is explained in detail below.

Examples

Show Usage

pdfclient

By typing pdfclient without parameters on the command line, the usage and examples are shown.

Basic

pdfclient -v -url http://<hostname>:<port>/conversion/v1.0/rest file.pdf ^
-pw <password> encrypted.pdf output.pdf

Sends the files file.pdf and encrypted.pdf to the 4-Heights™ Conversion Service through the REST API endpoint url http://<hostname>:<port>/conversion/v1.0/rest (see Service Host Address) and saves the result as output.pdf. Option -v turns on verbose mode, option -url sets the service endpoint url and option -pw supplies the password for encrypted.pdf. If the service endpoint url (-url) is not set, "localhost" and the default port are used.

Workflow and Profile

pdfclient -w "Archive PDF/A-2" -p "myCustomProfile" input.pdf output.pdf

Use options -w and -p to select a specific workflow and profile for the job. In this example the workflow is set to "Archive PDF/A-2" and the profile is set to "myCustomProfile". If the options are not specified the service's configured default workflow and profile are used.

Wildcards

pdfclient -r *.ext C:\path\to\output.pdf

---

5 The pdfclient is added to the PATH environment setting during installation.
Sends all files with extension `.ext` from the current working directory and all subdirectories to the 4-Heights™ Conversion Service and saves the result as a single output document `C:\path\to\output.pdf`.

```
pdfclient -s *.ext C:\path\to\output
```

Process the files with extension `.ext` as separate jobs and save the results in `C:\path\to\output`. The output directory must already exist. Existing output files are overwritten by default. Output options such as creating unique filenames instead of overwriting existing files are explained in the usage of the tool.

**Batch Processing**

```
pdfclient -r -s C:\path\to\input C:\path\to\output
```

Sends the files inside `C:\path\to\input` including all subdirectories to the 4-Heights™ Conversion Service, and saves the results in `C:\path\to\output` with the same file structure as in the input directory. Existing output files are overwritten. Output options such as creating unique filenames instead of overwriting existing files are explained in the usage of the tool.

### 5.6 GUI Client

The GUI Client is an easy to use graphical tool intended for testing and familiarizing yourself with the 4-Heights™ Conversion Service. It interacts with the 4-Heights™ Conversion Service via REST API.

**4-Heights™ Conversion Service GUI Client**

- **Input** Drag & drop the documents to be processed to the input area. To remove individual documents from the list select them and press the delete or back key. To remove all documents from the list click on Clear List.
Conversion Options  Select the workflow and the profile to be used for the conversion. The merge option controls the processing mode. If it is switched on, all input documents are gathered into one job, resulting in one merged output document. If it is switched off, every document gets processed in a separate job, resulting in one output document per input document.

Output  Choose where to store the resulting document(s). If merge is switched on, choose the filename of the resulting document.

5.6.1 Settings Window

The service endpoint URL can be changed in the settings window of the 4-Heights™ Conversion Service GUI Client. The default value is http://localhost:13033/conversion/v1.0/rest.

![Settings window of 4-Heights™ Conversion Service GUI Client]

5.7 REST API

The 4-Heights™ Conversion Service offers a REST API that allows to schedule jobs and get service status information. The REST API is also used by the other clients, e.g. the Shell Client pdfclient or Watched Folder.

The service endpoint URL of the REST API is defined by the Service Host Address of the service configuration. The default value is http://localhost:13033/conversion/v1.0/rest.

Security Considerations

The API is by default available on the local machine only. If it should be accessible remotely, the computer's firewall must be configured accordingly, e.g. using the Configurator GUI. When opening the port in the firewall it is recommended to add a rule that is as strict as possible, i.e. to not allow connections from untrusted computers.

Note that the REST API is designed for use in a protected intranet only. It offers no user authentication nor other security measures, e.g. against denial-of-service attacks. If this is required, a web application firewall (WAF) is recommended.

The API does not currently support Cross-Origin Resource Sharing (CORS). So requests sent using JavaScript in a browser must be from a website that runs on localhost. For that reason requests generated by popular online OpenAPI viewers will fail with a CORS error.

5.7.1 API Usage

The API is described in detail by the OpenAPI document doc/openapi.yaml inside the installation directory. The YAML document can be viewed in an OpenAPI editor or used to generate client stub code of any programming language.
The API supports XML and JSON in the bodies of requests and responses. So it is recommended to set the headers `Content-Type` and `Accept` to the preferred type.

In case of an error, the API returns a suitable HTTP status code as well as a problem details object (RFC 7807). This object contains more information on the type and cause of the error. Notably, the object's property `detail` contains a human-readable explanation that is helpful to troubleshoot the issue. Therefore, it is recommended to parse and use the problem details object (Content-Type application/problem+json and application/problem+xml respectively) whenever the returned HTTP status code indicates an error.

**Job Processing**

For a general overview of how jobs are processed by the 4-Heights™ Conversion Service, see chapter Processing Documents or the documentation of a specific workflow, such as the Archiving PDF/A-2.

To schedule a job and retrieve its result, the following simplified sequence described in Job Processing Sequence can be used.

**Job Processing Sequence**

There is no limit of the number of jobs that can be started concurrently. The service will process the jobs in the order they were created, using the highest concurrency allowed by the system's CPU and the license. Nonetheless, it is
recommended to not start much more jobs than the service can process. For example, on a machine with 8 CPU cores and a license for 8 cores, not much more than 8 jobs should be started\(^6\).

**Service Information**

These methods return service status information.

The `getServiceStatus` method can be used to retrieve general status information. This is suitable to verify if the service is running, e.g. for health check monitoring. In addition, information on the service’s load and general job count information is returned.

The `listJobs` method returns a list of all jobs and their status. This is useful to see what tasks are executing.

The `listWorkflows` method returns a list of all workflows and their profiles.

### 5.8 Plugins

Plugins are non-standard components used for extending the 4-Heights™ Conversion Service with custom workflows. They are managed in the plugins tab of the 4-Heights™ Conversion Service Configurator GUI. This tab is only displayed if the corresponding license feature is active. All installed plugins are listed here.

To install a new plugin, click **Install Plugin** and choose the ZIP file containing it. To update or delete a plugin, click on the respective icon. These actions require a service restart to take effect.

Each plugin version is designed for a specific version of the 4-Heights™ Conversion Service. So when upgrading the 4-Heights™ Conversion Service, all plugins must be upgraded as well. Unless the plugins are updated, the service is not operational.

\(^6\) Note that this is a very simplified example. To determine the maximum concurrency, the whole system and configuration must be taken into consideration. Dependent systems, such as an OCR service or Office conversion might further limit the maximum concurrency.
Plugins tab of the 4-Heights™ Conversion Service Configurator
6 Troubleshooting

6.1 Error Codes

If an error occurs during processing in a workflow, an error code with an explanatory message is returned.

The following are common error codes:

**Internal**  The 4-Heights™ Conversion Service is not operational because of an internal issue, e.g. an incomplete installation or erroneous configuration.

A detailed description of the problem is written to the service log file with severity Error. The service administrator should be notified of the problem.

Because the issue is not related to the client nor the request, no specific error message is returned. This behavior can be changed in the service configuration. However, since the error is related to the service's configuration and the detailed description is designed to help the administrator resolve the problem quickly, the message might reveal internal configuration settings that one might not want to disclose to clients. Therefore, this is generally only recommended during installation and testing of the 4-Heights™ Conversion Service.

**Generic**  A generic error occurred.

**UnsupportedFormat**  The format of the input data is not supported.

**UnsupportedFeature**  An unsupported feature was requested. This might be a feature of the input data or one requested using options.

**Option**  An error occurred that is related to job or document options passed by the client. For example:

- A required option is missing.
- An option has an invalid or unsupported value.

**Canceled**  The job has been canceled, either by the user or because of a processing timeout.

**Password**  The data cannot be processed because of a missing or invalid password. Retry the conversion specifying the missing password using the document option DOC.PASSWORD. This option can be added multiple times to try several passwords for a document or to specify passwords for multiple files, e.g. attachments or embedded files.

**Conformance**  There is a problem with the conformance of the input data. For example:

- The input data's conformance is not supported.
- The input data cannot be converted to meet the conformance required by the workflow and profile.

**Corrupt**  Data cannot be processed because it is corrupt.

6.2 Office Conversion Problems

6.2.1 Configuration Problems

Some of the Warnings and Errors that can be encountered inside the Configurator during the Office Configuration are detailed hereafter and suggestions to fix the issues are explained.
**Solution**  The conversion of Word, Excel and PowerPoint documents to PDF requires an installation of Microsoft Office on the same server where the Conversion Service is installed. Please install a compatible Microsoft Office version (see [Compatible Microsoft Office Versions](#)).

**Description**  A parallel operation of the 4-Heights™ Conversion Service and the 3-Heights™ Document Converter on the same server is not recommended because the Office configurations of the two services interfere and break each other.

**Solution**  This error usually occurs when the domain of the domain user is not recognized. Double check the spelling and please specify the domain by writing the username in SAM or UPN format, e.g. YourDomain\YourDomainUser or YourDomainUser@YourDomain.com, respectively.

**Solution**  This error usually signals a connection problem between the server and the domain controller. Double check that the server where the Conversion Service is installed is a member of the domain you are trying to access.
Solution  The message Office configuration problem can occur, when a setting related to the Office Configuration was changed after the Office User was successfully configured. Try to configure the Office User again, if the problem persists or another error occurs please follow the steps described in Submitting a Support Request.

6.2.2 Specific errors related to Word, Excel and PowerPoint documents

Internal: An internal error occurred. The service is not operational, please contact your administrator. If a Word, Excel or PowerPoint document was converted and the ErrorCode is Internal, this usually refers to a configuration problem. Open the Configurator and double check that the Office User was configured (see Office Configuration) and / or follow the steps described for the Internal Error Code.

Generic: Conversion of ‘Document.docx’ to PDF aborted. The application process was blocked by a popup. A popup blocks opening or conversion of the Office document. Sometimes the triggering of the popup can be removed by opening and editing the document manually.

Generic: ...The application process exceeded the allocated memory limit of 500 MB. This usually indicates a memory leak inside the document or the document is too large to process. There is no straightforward way to fix this problem. For further assistance, please follow the steps in Submitting a Support Request and include the input file.

6.3 Service Log

The 4-Heights™ Conversion Service writes verbose information to a log file. This allows the administrator to monitor the service's operation and also troubleshoot problems after an event.
The location of the standard log files can be configured using the Service Configuration. The name of the log files is ConversionService-Service.log. After each day, the old log file is compressed and moved to the file ConversionService-Service-yyyy-mm-dd.log.zip. A maximum of 90 archived log files are kept.

### Log Entry Properties

In addition to standard properties, log entries contain the following:

**Level**  The severity of the message. The following severities are common:

- **Fatal**  Severe error. See **Error** below.

- **Error**  Error that prevents the service from operating, e.g. because of an incomplete installation or invalid configuration. Clients sending processing requests to the service will get an error code **Internal**.

  It is recommended, that the service administrator is notified whenever a message of severity **Error** or higher occurs. This can be achieved by monitoring the standard service log file or creating a **Custom Log**.

- **Warn**  Errors that are not critical and do not prevent the service from operating. Even though no immediate action by the service administrator is required, it is advisable to review warnings periodically and decide, if an action is required.

- **Info**  Informational events are useful to monitor the service's operation.

- **Debug**  Debug and tracing messages are strictly for development purposes and analysis by the PDF Tools AG support team. During productive use of the service, messages of this level should be disabled for performance reasons.

  **Trace**  See **Debug** above.

**Process Name**  The name or type of the process in which the log event occurred.

**Message**  The log message.

**Exception**  Critical log messages often have an exception associated that contains more detailed information on the message's cause.

**Job ID**  Using the job id all messages of a particular processing job can be filtered for analysis.

**Task ID**  This is an internal ID used by the service that is useful for analysis by PDF Tools AG support team.

**Remote IP**  The IP address of the remote host (client). This is meaningful only for messages that are associated with a request at the REST api.

### Reading the Log File

The standard log file is in CSV format, for which many different tools are available. Many of them offer a tabular view of CSV files, highlighting by log message severity, and filtering.

### Custom Log

For logging the 4-Heights™ Conversion Service uses **NLog**, a very flexible logging platform. This allows to create additional log outputs, e.g. to write to a database or the Windows Event Log.
Layout Renderers

The following additional layout renderers are available in the 4-Heights™ Conversion Service:

${gdc:processName}  The Process Name.

${mdlc:jobId}  The Job ID.

${mdlc:taskId}  The Task ID.

${mdlc:remote-ip}  The Remote IP.

Examples

To add a new log output a file NLog.config can be created in the directory bin of the installation directory. Also see the documentation of NLog for more information.

Note:  A new logging configuration can be tested by disabling the 4-Heights™ Conversion Service's license in the license manager. When the service is restarted and a job scheduled, an error is logged.

More information on logging configuration issues can be obtained by activating internal logging:

```xml
<nlog internalLogLevel="Info"
    internalLogFile="c:\path\to\nloglog.txt"
    ...
</nlog>
```

Example:  A NLog.config that generates a log file C:\path\to\mylog.log.

```xml
<?xml version="1.0" encoding="utf-8"?>
<nlog xmlns="http://www.nlog-project.org/schemas/NLog.xsd"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <targets>
    <target name="mylog" xsi:type="File" fileName="C:\path/to/mylog.log">
      <layout xsi:type="CsvLayout" delimiter="Comma" withHeader="true">
        <column name="time" layout="${longdate}"/>
        <column name="level" layout="${level:upperCase=true}"/>
        <column name="processName" layout="${gdc:processName}"/>
        <column name="message" layout="${replace-newlines:${message}}"/>
        <column name="exception" layout="${replace-newlines:${exception:format=ShortType,Message:innerFormat=ShortType,Message:maxInnerExceptionLevel=1}}"/>
        <column name="jobId" layout="${mdlc:job-id}"/>
        <column name="taskId" layout="${mdlc:task-id}"/>
        <column name="remoteIp" layout="${mdlc:remote-ip}"/>
      </layout>
    </target>
  </targets>
  <rules>
    <logger name="*" minlevel="Info" writeTo="mylog"/>
  </rules>
</nlog>
```
Example: A NLog.config that writes critical messages to the Windows Event Log.

```xml
<?xml version="1.0" encoding="utf-8"?>
<nlog xmlns="http://www.nlog-project.org/schemas/NLog.xsd"
     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <extensions>
        <add assembly="NLog.WindowsEventLog"/>
    </extensions>

    <targets>
        <target name="eventlog" xsi:type="EventLog"
                 source="Conversion Service"
                 layout="${message}${newline}Process name: ${gdc:processName}${newline}Job ID: ${mdlc:job-id}${newline}Task ID: ${mdlc:task-id}${newline}${exception:format=ToString}"
        />
    </targets>

    <rules>
        <logger name="*" minlevel="Error" writeTo="eventlog"/>
    </rules>
</nlog>
```

Example: A NLog.config that sends critical messages by email.

```xml
<?xml version="1.0" encoding="utf-8"?>
<nlog xmlns="http://www.nlog-project.org/schemas/NLog.xsd"
     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <extensions>
        <add assembly="NLog.MailKit"/>
    </extensions>

    <targets>
        <target name="maillog" xsi:type="Mail"
                 subject="Conversion Service Error: ${message}"
                 body="${message}${newline}Process name: ${gdc:processName}${newline}Job ID: ${mdlc:job-id}${newline}Task ID: ${mdlc:task-id}${newline}${exception:format=ToString}"
                 to="admin@example.com"
                 from="system@example.com"
                 smtpUserName="user"
                 smtpPassword="password"
                 smtpServer="smtp.example.com"
                 smtpPort="587"
                 smtpAuthentication="Basic"
                 secureSocketOption="StartTls"
        />
    </targets>

    <rules>
        <logger name="*" minlevel="Error" writeTo="maillog"/>
    </rules>
</nlog>
```
6.4 Submitting a Support Request

For submitting a support request, use the support request form on www.pdf-tools.com. Depending on the type of issue, different data should be provided in addition to the problem description.

**General Issues**

Use the 4-Heights™ Conversion Service Configurator GUI to gather the necessary files for a support request. In the Support Request tab, click on Create Zip and attach the resulting ZIP file to your support request.

![Support Request tab of the 4-Heights™ Conversion Service Configurator](image)

The resulting file will contain configuration and log files. However, no sensitive information is included, notably no input files, nor any passwords from the configuration or client options are included.

**Issue related to a particular job**

Please submit the following data:

- Data described above in chapter General Issues.
- Input files and options used for the conversion.
- The JobId of the conversion.
7 Version History

7.1 Version 2

Changes in Version 2

- **New** conversion of Word, Excel and PowerPoint documents within the 4-Heights™ Conversion Service through Microsoft Office Applications. A parallel installation of the 3-Heights™ Document Converter is no longer required and no longer supported for this purpose.
- **New** Docker image "pdftoolsag/conversion-service" of the 4-Heights™ Conversion Service.
- **New** conversion of RTF documents.
- **Changed** license key format to 4H-V2-XXXXX-XXXXX-XXXXX-XXXXX-XXXXX-XXXXX-XXXXX-XXXXX. License keys with the format 1-XXXXX-XXXXX-XXXXX-XXXXX-XXXXX-XXXXX-XXXXX-XXXXX are no longer supported.

7.2 Version 1

Changes in Version 1

- **Changed** minimum required version of 3-Heights™ Document Converter Enterprise Edition to version 6.5.
- **Changed** port to connect to 3-Heights™ Document Converter Enterprise Edition to 7983.
- **New** requirement of Microsoft Windows Desktop Runtime 3.1 (Windows, x64) and Microsoft ASP.NET Core Runtime 3.1 (Windows, x64). This is in addition to the .NET Framework 4.7.
- Changes to the REST API
  - **Changed** to return RFC 7807 Problem object instead of proprietary error object.
  - **Changed** JSON serialization of enum values from integer to string.
  - **Changed** XML objects to use no namespace in accordance with openapi.yaml.
  - **New** codes in the service status response.
- **New** GUI Client for manual processing.
- **New** view in the 4-Heights™ Conversion Service Configurator GUI for submitting a support request.
- **New** profile option for job priority in workflow "Archive PDF/A2".
- **New** profile configuration (Digital Signature) available in the configurator GUI.
- **New** attachment information is shown as part of the email header.
- **New** possibility to import/export profile configurations.
- **New** license dependent view in the 4-Heights™ Conversion Service Configurator GUI for installing plugins.
- **New** document content overflow into the margin when converting emails is signaled with ContentOverflowWarning.
- **New** service setting for proxy configuration.
- **New** documentation panel in the 4-Heights™ Conversion Service Configurator GUI.
8 Licensing, Copyright, and Contact

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