Manual

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1 Preface

KOST-Val is a Java-based application for validating the structure and content of PDF/A, JP2, JPEG, TIFF, PNG, FLAC, WAVE, MP3, MKV, MP4, XML, SIARD files as well as Submission Information Packages (SIP) for digital information ingest. It is an open source application under a GPL v3+ licence. KOST-Val uses unmodified components of other manufacturers by embedding them directly into the source code. Users of KOST-Val are requested to adhere to these components 'terms of licence. Please refer to chapter 9 for further information.

The results (including information on inconsistencies and errors) are output for every step and written into a validation log.

The validation steps are executed sequentially. Whenever possible the validation shall continue after an error has been detected in order to reduce the number of correction cycles.

2 System requirements

- 64bit Microsoft Windows
- At least 512 MB RAM
- At least 20 GB hard disk space

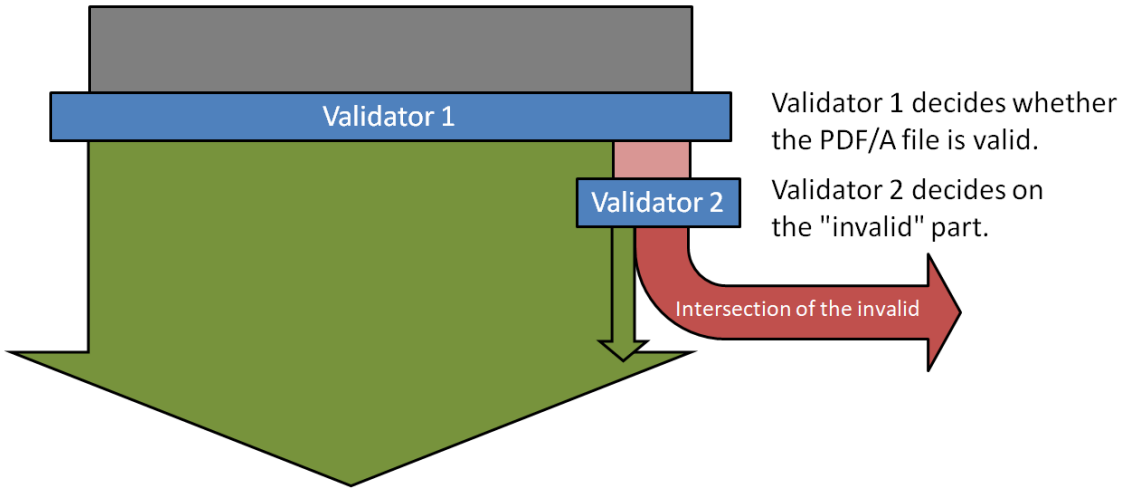
3 Open issues / Feedback

Open issues ranging including bugs, requested features, and questions, are listed on the software development platform GitHub at https://github.com/KOST-CECO/KOST-Val/issues and can also be communicated to kost-val@kost-ceco.ch.

These issues are managed by the development team. Any and all contributions are welcome.

4 Introduction dual PDF/A validation

For PDF/A KOST-Val offers the possibility of a dual validation. A PDF/A file is first checked by a first validator. If the result is invalid, a check by a second validator follows. The PDF/A file is considered valid if at least one of the validators identifies it as valid, and as invalid if both validators identify it as invalid.[1]



Dual PDF/A validation may only be used if the archive allows potentially invalid PDF/A files to be accepted. If this is not the case, dual PDF/A validation should be avoided.

Both 3-Heights™ PDF/A Validator from PDF-Tools and pdfaPilot from callas are used for dual validation. If only one validator is activated, a single validation is automatically performed.

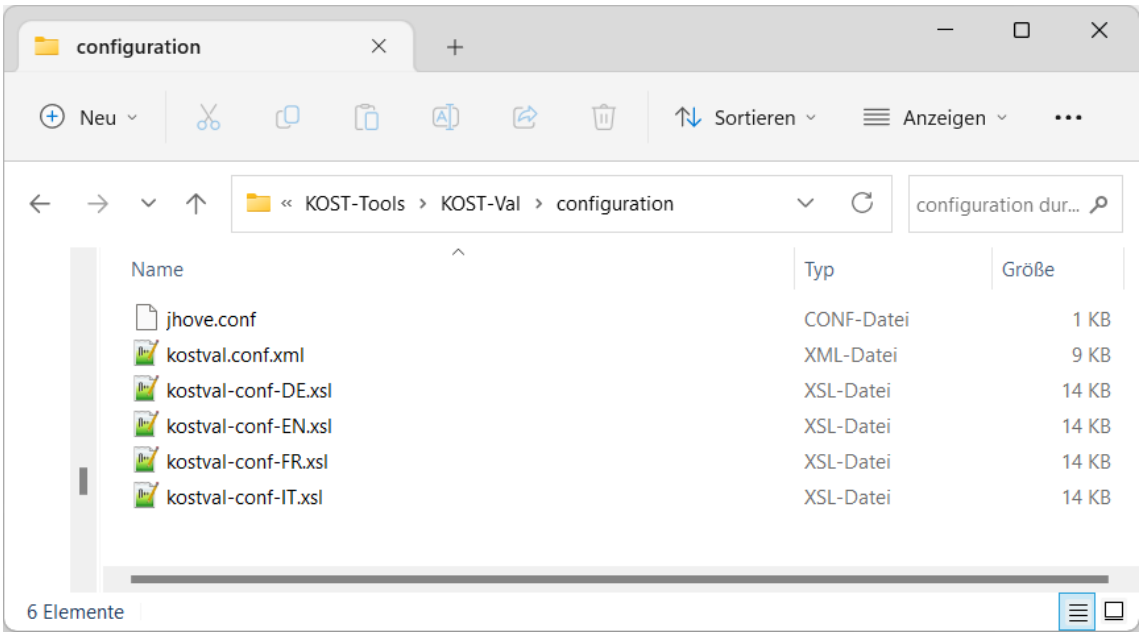
The conceptual basis for dual validation is the observation that even high-quality PDF/A validators can produce different results. This is due on the one hand to the fact that the actual PDF/A standard includes a set of other standards which are not necessarily implemented in the validators in every detail. On the other hand, certain specifications of the standard are formulated in such a way that they can legitimately be implemented in various ways. The fact that all relevant tools implement the specification uniformly and completely remains a pipe dream for the time being. Therefore KOST-Val offers dual validation as an interim solution.

[1] The dual validation can only be carried out with high-quality PDF/A validators in this sense. These high requirements are fulfilled among others by the latest versions of 3-Heights™ PDF/A Validator from PDF-Tools and pdfaPilot from callas.

5 Installation of KOST-Val

1	KOST-Val (version 2.1.3.0 and newer) is only offered in the 64bit installation package KOST-Tools.msi[2]. https://github.com/KOST-CECO/KOST-Val/releases/latest After downloading KOST-Tools the installation package must be executed with administration rights. KOST-Val is then available in the start menu under KOST-Tools.

6 Configuration of KOST-Val



The "configuration" folder contains the file "jhove.conf" that do not need adjustment.

"jhove.conf" is used for the internal validation by JHOVE.

The configuration file "kostval.conf.xml" as well as the four style sheets are copied to the directory "USERHOME/.kost-val_2x/configuration" if not correct or currently available. All configurations of the KOST-Val can be made via GUI.

6.1 Parts of the configuration file "kostval.conf.xml"

The configuration file "kostval.conf.xml" consists of several parts.
The following is a short description of the configuration parts.

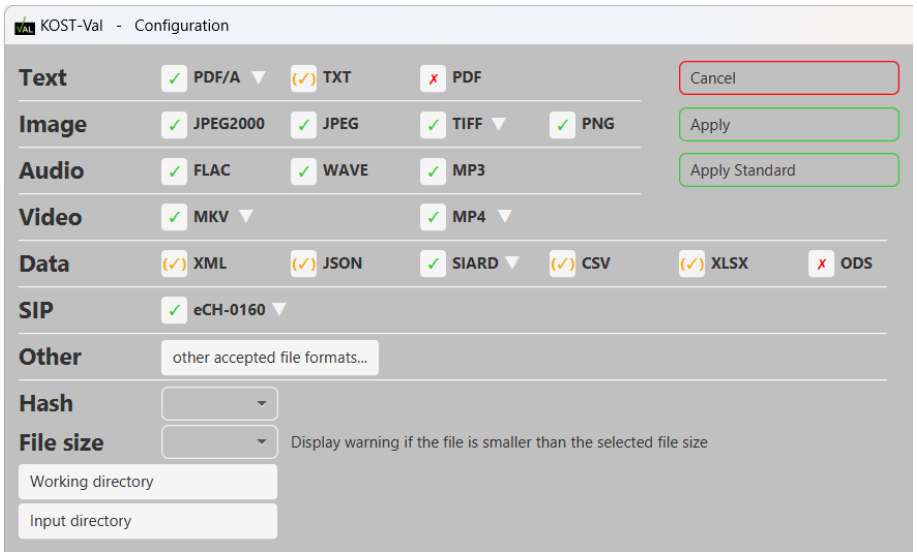
[2] More detailed instructions on the installation and its scope can be found in the KOST-Tools manual.

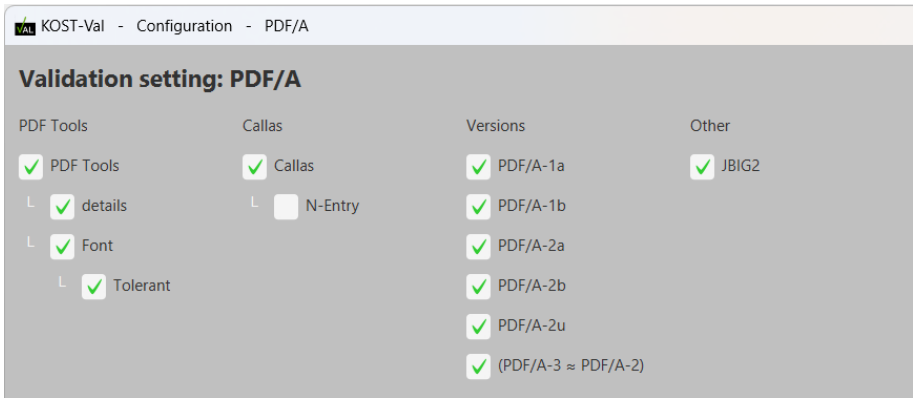
KOST-Val **Configuration**

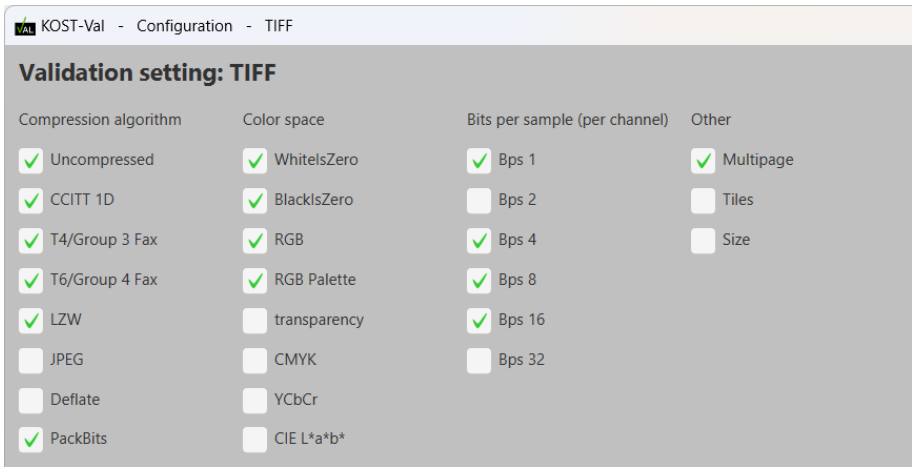
Legend:

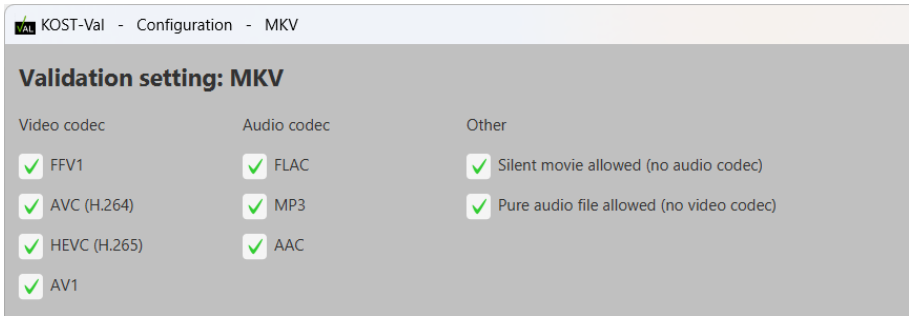
✓ = accepted and validate
(✓) = accepted
✗ = not accepted

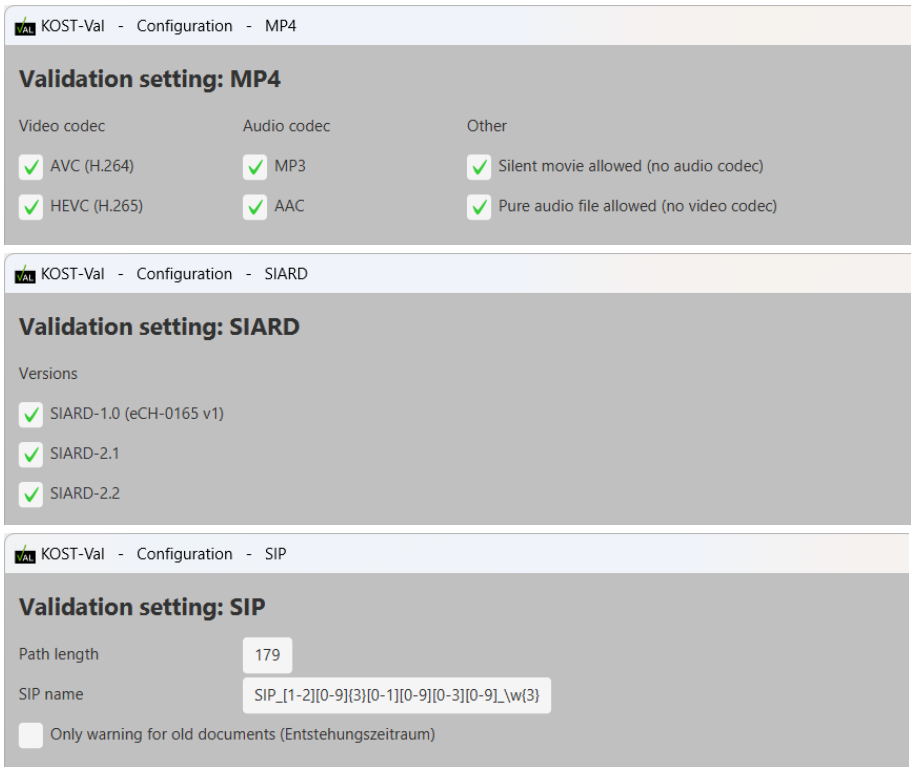
PDF/A: Acceptance and validation [✓]	✓
PDF/A validation with PDF Tools [yes]:	yes
- PDF Tools also detailed errors in English [yes]:	yes
- Validation (searchability and extractability) [tolerant]:	tolerant
PDF/A validation with callas [yes]:	yes
- Error (E) / warning (W) if N entry does not match [W]:	W
Allowed PDF/A versions [1A, 1B, 2A, 2B, 2U]:	1A 1B 2A 2B 2U
Validate PDF/A-3 to PDF/A-2 and generate warning message instead of error [yes]:	yes
JBIG2 compression allowed [yes]:	yes
TXT: Acceptance [(✓)]	(✓)
PDF: Acceptance [✗]	✗
JPEG2000: Acceptance and validation [✓]	✓
JPEG: Acceptance and validation [✓]	✓
TIFF: Acceptance and validation [✓]	✓
Allowed compression algorithms [uncompressed, CCITT 1D, CCITT Group 3, CCITT Group 4, LZW, PackBits]:	uncompressed CCITT 1D CCITT Group 3 CCITT Group 4 LZW PackBits
Allowed color spaces [white is zero, black is zero, RGB, palette color]:	white is zero black is zero RGB palette color
Bits per sample allowed [1, 4, 8, 16]:	1 4 8 16
Multipage TIFFs allowed [yes]:	yes
Build in tiles allowed [no]:	no
File sizes of 1000MB (~1GB) and larger allowed [no]:	no
PNG: Acceptance and validation [✓]	✓
FLAC: Acceptance [✓]	✓
WAVE: Acceptance [✓]	✓
MP3: Acceptance [✓]	✓
MKV: Acceptance and validation [✓]	✓
- Allowed video codec [FFV1, AVC, HEVC, AV1]:	FFV1 AVC HEVC AV1
- Allowed audio codec [FLAC, MP3, AAC]:	FLAC MP3 AAC
- Silent movie allowed (no audio codec) [Warning]:	Warning
- Pure audio file allowed (no video codec) [Warning]:	Warning
MP4: Acceptance and validation [✓]	✓
- Allowed video codec [AVC, HEVC]:	AVC HEVC
- Allowed audio codec [MP3, AAC]:	MP3 AAC
- Silent movie allowed (no audio codec) [Warning]:	Warning
- Pure audio file allowed (no video codec) [Warning]:	Warning
XML: Acceptance and validation [(✓)]	(✓)
JSON: Acceptance [(✓)]	(✓)
SIARD: Acceptance and validation [✓]	✓
Allowed SIARD versions [1.0, 2.1, 2.2]:	1.0 2.1 2.2
CSV: Acceptance [(✓)]	(✓)
XLSX: Acceptance [(✓)]	(✓)
ODS: Acceptance [✗]	✗
SIP: Validation [✓]:	✓
Allowed maximum number of characters in path lengths [179]:	179
Specifications for the structure of the SIP name [SIP_[1-2][0-9]{3}[0-1][0-9][0-3][0-9]_\w{3}]:	SIP_[1-2][0-9]{3}[0-1][0-9][0-3][0-9]_\w{3}
Only warning for old documents (Entstehungszeitraum) [no]:	no
Other accepted file formats [WARC, HTML, DWG]:	HTML WARC DWG
Calculate and output hash value of files. Empty means no calculation and output []:	
Issue warning for small files. Empty means no warning []:	
Working directory []:	
Input directory []:	


KOST-Val - Configuration
Text
PDF/A
TXT
PDF
Image
JPEG2000
JPEG
TIFF
PNG
Audio
FLAC
WAVE
MP3
Video
MKV
MP4
Data
XML
JSON
SIARD
CSV
XLSX
ODS
SIP
eCH-0160
Other
other accepted file formats...
Hash
File size
Display warning if the file is smaller than the selected file size
Working directory
Input directory
Cancel
Apply
Apply Standard


KOST-Val - Configuration - PDF/A
Validation setting: PDF/A
PDF Tools
PDF Tools
details
Font
Tolerant
Callas
Callas
N-Entry
Versions
PDF/A-1a
PDF/A-1b
PDF/A-2a
PDF/A-2b
PDF/A-2u
(PDF/A-3 ≈ PDF/A-2)
Other
JBIG2

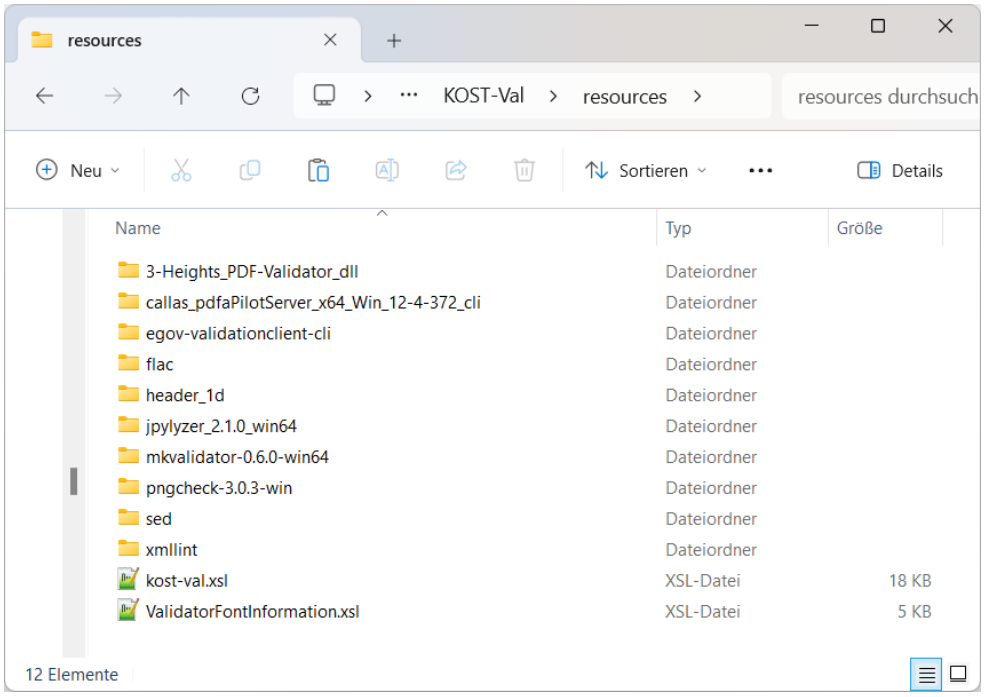

KOST-Val - Configuration - TIFF
Validation setting: TIFF
Compression algorithm
Uncompressed
CCITT 1D
T4/Group 3 Fax
T6/Group 4 Fax
LZW
JPEG
Deflate
PackBits
Color space
WhiteIsZero
BlackIsZero
RGB
RGB Palette
transparency
CMYK
YCbCr
CIE L*a*b*
Bits per sample (per channel)
Bps 1
Bps 2
Bps 4
Bps 8
Bps 16
Bps 32
Other
Multipage
Tiles
Size


KOST-Val - Configuration - MKV
Validation setting: MKV
Video codec
FFV1
AVC (H.264)
HEVC (H.265)
AV1
Audio codec
FLAC
MP3
AAC
Other
Silent movie allowed (no audio codec)
Pure audio file allowed (no video codec)


KOST-Val - Configuration - MP4
Validation setting: MP4
Video codec
AVC (H.264)
HEVC (H.265)
Audio codec
MP3
AAC
Other
Silent movie allowed (no audio codec)
Pure audio file allowed (no video codec)
KOST-Val - Configuration - SIARD
Validation setting: SIARD
Versions
SIARD-1.0 (eCH-0165 v1)
SIARD-2.1
SIARD-2.2
KOST-Val - Configuration - SIP
Validation setting: SIP
Path length
179
SIP name
SIP_[1-2][0-9]{3}[0-1][0-9][0-3][0-9]_\w{3}
Only warning for old documents (Entstehungszeitraum)

7 Resources of KOST-Val

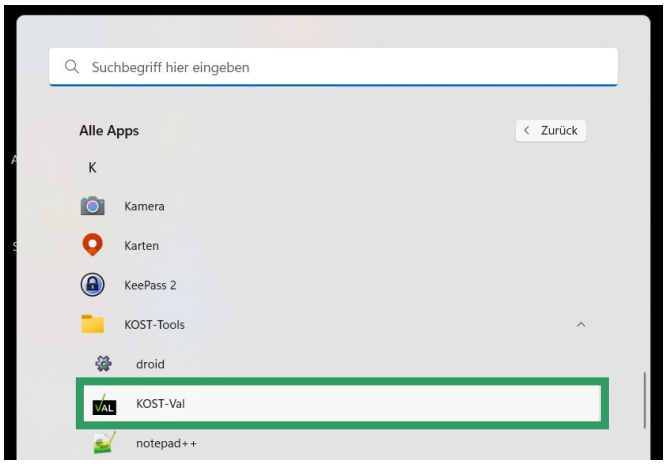
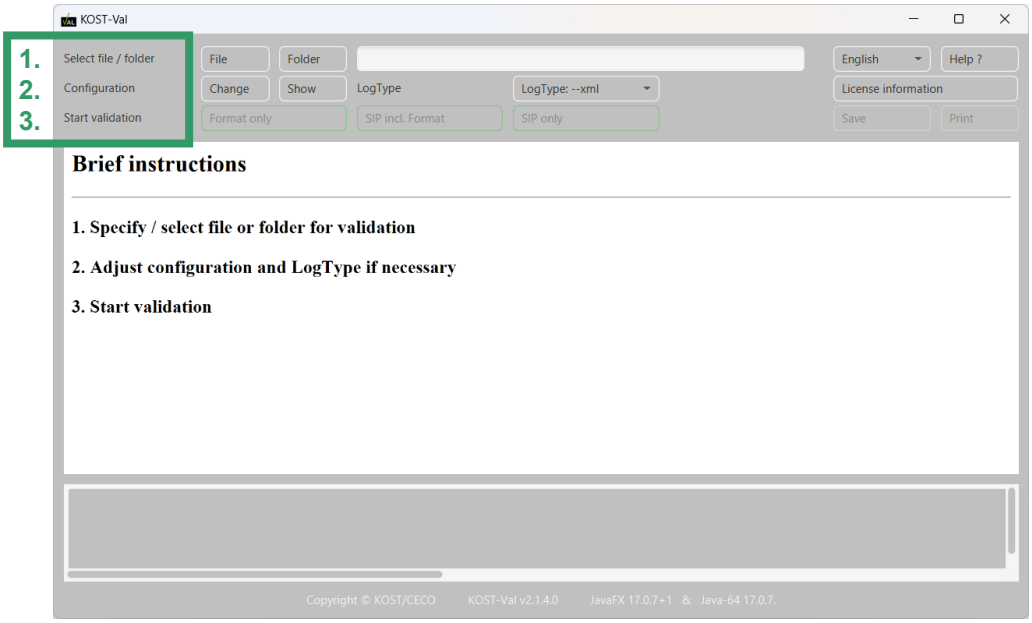
All resources of KOST-Val are stored in the subfolder "resources".

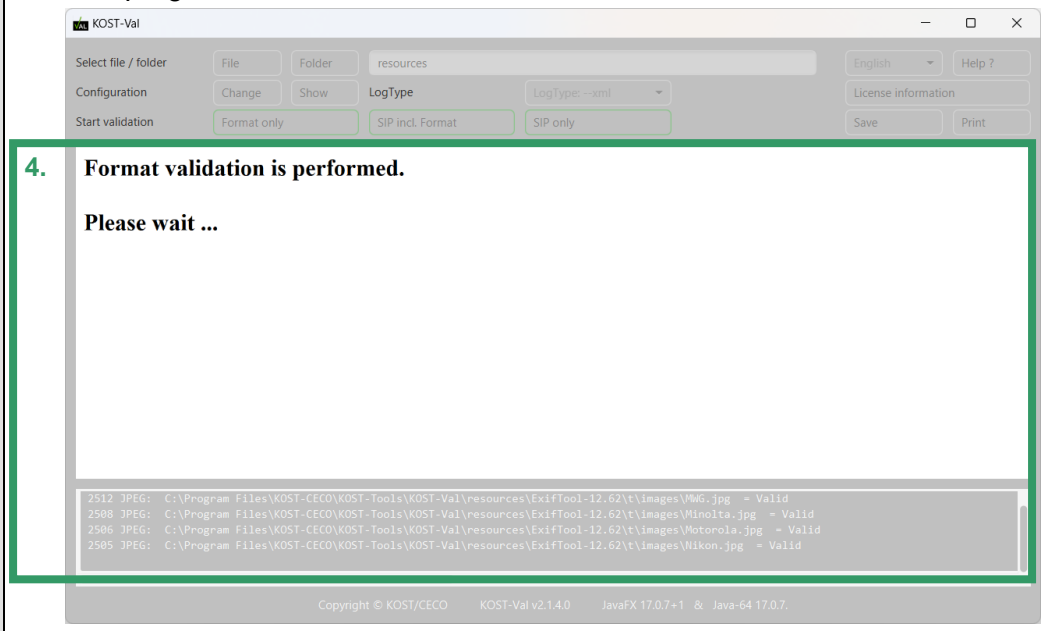
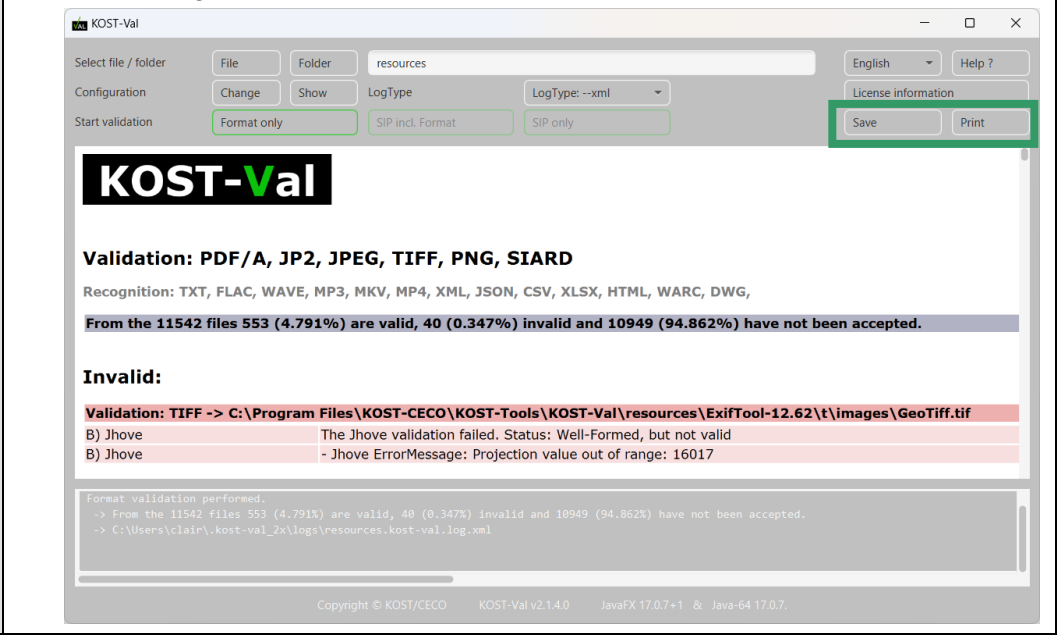


8 Start the validation

!	KOST-Val is not thread safe! That is to say that concurrent instances of KOST-Val cannot be executed without interfering with each other. Concurrent execution of KOST-Val may lead to errors such as a missing working copy.

8.1 KOST-Val GUI

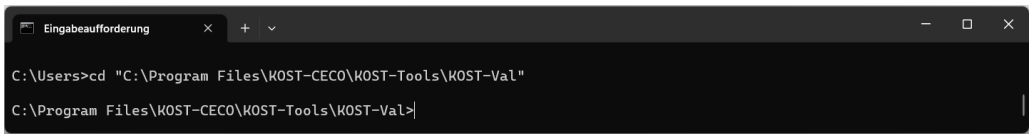
1	Start KOST-Val by clicking on “KOST-Val” in the “KOST-Tools” start menu. 
2	1. Specify / select file or folder for validation 2. Adjust configuration and LogType if necessary 3. Start validation 

	4. Wait until the validation is finished. The progress / current file is shown in the field below. 
3	At the end of the validation the log file is displayed. This log file contains additional detailed information about the individual invalid validation steps, in particular the affected validation step and the corresponding error. If desired, the KOST-Val-Log file can be saved or printed. 

8.2 Start the validation manually

1

Open a command prompt and change to the desired working directory (`cd "C:\Program Files\KOST-CECO\KOST-Tools\KOST-Val"`)[3].



2

Invoke the KOST-Val command (separate command options with spaces).

```
..\Liberica_JRE\bin\java.exe -jar cmd_KOST-Val.jar --format resources --en --xml
```

Notes:

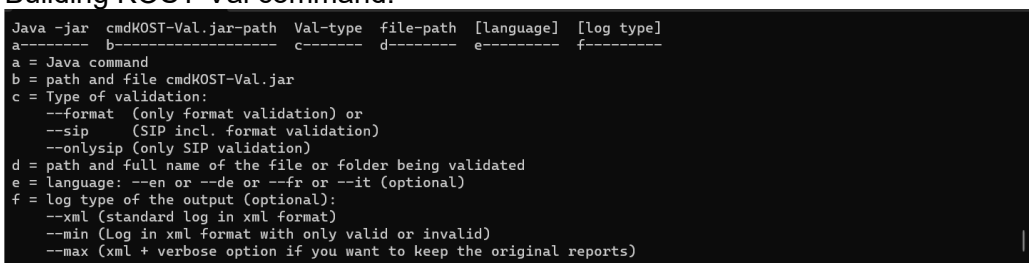
Invoking `java -jar` is possible only if the desired Java Runtime Environment (JRE) is the standard version.

If required, the Java Virtual Memory can be quickly adapted. -Xmx should be adjusted in "Out of Memory" and -Xss at "Stack Overflow" errors (`java -Xmx1024m -Xss128m -jar`).

A command component that contains spaces needs to be enclosed in quotation marks.

KOST-Val can be invoked from any location. However this may require using absolute paths.

Building KOST-Val command:



3

The file has been validated as soon as "`Valid`" or "`Invalid`" is displayed in the command window. The folder has been validated as soon as the prompt (`C:\Program Files\KOST-CECO\KOST-Tools\KOST-Val>`) is displayed.

Detailed results are available in the file kost-val.log.xml.

The overall result (valid/invalid file) is output as well. In addition, it is visible in the program's exit status in order for the validation to be embedded into an automated process chain. The exit status can take the following values:

- 0 everything is ok
- 1 incorrect program call
- 2 not valid

[3] To change the drive type, e.g., `c:`.

9 Copyright

KOST-Val has been developed by KOST. All rights reserved. KOST-Val has been published by KOST in 2012 under a GNU General Public License v3+.

Notice:	This product includes software developed by the Apache Software Foundation (http://www.apache.org/).

KOST-Val uses the following unmodified components of other manufacturers by embedding them directly into the source code:

Third party application / component	Version	License
3-Heights™ PDF/A Validator API http://www.pdf-tools.com	6.27.2.1	see Chapter 9.1
Apache Commons http://commons.apache.org/ - commons-logging-1.2.jar - commons-io-2.13.jar	 1.2 2.13	Apache License 2.0
Apache Xerces2 http://xerces.apache.org/	2.12.2	Apache License 2.0
BadPeggy http://coderslagoon.com/	2.0	GPL v3 License
Jdom http://www.jdom.org/	2.0.6.1	jdom License
Jhove https://jhove.openpreservation.org/	1.28	LGPL v2.1 License
Spring Framework API https://spring.io/projects/spring-framework	5.3.19	Apache License 2.0
zip64 http://sourceforge.net/projects/zip64file/	1.02	GPL v2+ License

KOST-Val uses the following unmodified components of other manufacturers which are delivered with KOST-Val:

Third party application / component	Version	License
egov-validationclient-cli https://www.bit.admin.ch/	1.0.10	see Chapter 9.3
flac https://xiph.org/flac	1.4.3	BSD License
Jpylyzer http://jpylyzer.openpreservation.org/	2.1.0	LGPL v3.0 License
mkvalidator https://www.matroska.org/	0.6.0	BSD License
pdfaPilot CLI https://www.callassoftware.com	12.4.372	see Chapter 9.2
pngcheck http://libpng.org/pub/png/apps/pngcheck	3.0.3	GPL v2 License
GNU sed https://www.gnu.org/software/sed	4.4	GPL v3+ License
Xmllint https://xmllint.com/	20630	MIT License

Users of KOST-Val are requested to adhere to these components‘ terms of licence available in the folder KOST-Val\license.

9.1 3-Heights™ PDF/A Validator API License

For the use of the Restricted Version of the 3-Heights™ PDF/A Validator from PDF Tools KOST has made the following individual agreement on the General License Terms with PDF Tools:

2. Individuelle Vereinbarung

Dieses Vertragsverhältnis regelt die Client-Lizenz zwischen der PDF TOOLS als Lizenzgeber und der KOST als Lizenznehmer gemäss nachfolgenden Spezialbestimmungen:

- PDF Tools AG erteilt für KOST eine kostenfreie OEM-Lizenz für das 3-Heights™ PDF/A Validator API als Zusatzfunktion ihrer eigenen Validator-Software (KOST-Val).
- Die Lizenz schliesst den Gebrauch der Software (KOST-Val) durch Gedächtnisinstitutionen, bestehend aus Archiven oder Bibliotheken, deren Zulieferer und der KOST selbst, ein.
- Der OEM-Lizenzschlüssel, welcher fest in KOST-Val eingebunden ist, darf nicht ausserhalb der Applikation (KOST-Val) verwendet werden.
- Die Lizenz ist zeitlich unbegrenzt, jedoch bezüglich Durchsatz pro Installation begrenzt (72'000 Seiten pro Jahr).
- Für die Verteilung der Software (KOST-Val) an den Anwender ist die KOST zuständig.
- Der First Level Support der Anwender erfolgt durch KOST. Second Level Support Fälle leitet KOST an PDF Tools AG weiter.
- Wenn der Anwender weitergehende Bedürfnisse hat, z.B. höherer Durchsatz, Integration in andere Applikationen etc. kauft er die Software (3-Heights™ PDF/A Validator API) direkt bei PDF Tools AG.
- Die KOST darf weiterhin den Quellcode von KOST-Val Open Source publizieren und KOST-Val gratis und ohne Registrierung abgeben.

The following points are decisive for users:

- The license includes the use of the software (KOST-Val) by memory institutions consisting of archives or libraries, their suppliers and KOST itself.
- The OEM licence key, which is firmly integrated in KOST-Val, may not be used outside the application (KOST-Val).
- The license is unlimited in time, but limited in throughput per installation (72'000 pages per year).
- The first level support of the users is provided by KOST. Second Level Support cases are forwarded by KOST to PDF Tools AG.
- If the user has additional requirements, e.g. higher throughput, integration in other applications, etc., he or she can purchase the software (3-Heights™ PDF/A Validator API) directly from PDF Tools AG. The activation of this license is done with the “LicenseManager.exe”, which already exists in “KOST-Val\resources\3-Heights_PDF-Validator_dll”.

Users of KOST-Val are required to comply with this license agreement.

9.2 pdfaPilot CLI License

For the use of the Restricted Version of the pdfaPilot CLI from callas KOST has agreed the following Individual Agreement on the General License Conditions with callas:

2. Individuelle Vereinbarung

Dieses Vertragsverhältnis regelt die Lizenz zwischen der callas software als Lizenzgeber und der KOST als Lizenznehmer gemäss nachfolgenden Spezialbestimmungen:

- callas software erteilt für die KOST eine kostenfreie Lizenz für callas pdfaPilot CLI für Windows zur innerbetrieblichen Nutzung und zur Integration in ihren eigenen Validator „KOST-Val".
- Die Lizenz schliesst die Distribution von KOST-Val an „Anwender" (Gedächtnisinstitutionen, Archive oder Bibliotheken und deren Zulieferer) ein.
- Für die Distribution von KOST-Val an diese Anwender ist die KOST zuständig und darf KOST-Val auch gratis und ohne Registrierung an diese abgeben.
- Die Lizenz ist zeitlich unbegrenzt, jedoch bezüglich Durchsatz pro Installation begrenzt auf 72'000 Seiten pro Jahr.
- Die KOST darf den eigenen Quellcode von KOST-Val Open Source publizieren. callas pdfaPilot CLI ist hiervon ausgenommen.
- First Level Support der Anwender erfolgt durch die KOST. Second Level Support leistet callas software gegenüber der KOST.

The following points are decisive for users:

- The license includes the distribution of KOST-Val to "users" (memory institutions, archives or libraries and their suppliers).
- The license is unlimited in time, but limited in throughput per installation to 72'000 pages per year.
- KOST may publish the own source code of KOST-Val Open Source. callas pdfaPilot CLI is excluded from this.
- First Level Support of the users is provided by KOST. Second level support is provided by callas software to KOST.

The users of KOST-Val are obliged to comply with this license agreement.

9.3 egov-validationclient-cli license

A license for the federal government's discrete signature validator is required for the validation of electronic signatures in PDF/PDF/A files. This license is not included in KOST-Val. More information can be found at https://www.bit.admin.ch/bit/en/home/themes/elektronische-signatur/anzeigen-und-validieren/der-diskrete-validator/validator-web-service.html.

KOST-Val 2.2.0.0 does not yet perform signature validation. So far, only recognition has been programmed, which does not require a license.

10 Annex

10.1 Program structure

KOST-Val is structured according to the following requirements:

Functional requirements:

For every step the results (including information on inconsistencies and errors) are output and written into a validation log.

The overall result (valid/invalid file) is output as well. In addition, it is visible in the program's exit status in order for the validation to be embedded into an automated process chain. The exit status can take the following values:

0 everything is ok

1 incorrect program call

2 not valid

The validation steps are executed sequentially. Whenever possible the validation shall continue after an error has been detected in order to reduce the number of correction cycles.

Non-functional requirements:

External programs or java frameworks are used for particular tasks.

The application has a modular structure that allows for inserting additional validation modules without further ado.

The validation log and exit status permit an easy readout of a single validation result and allow the utilisation of the tool in a process chain.

The console output is limited on the validation module, the final results of either "valid" or "invalid" and the path to the file. All additional information is documented in the log file.

10.2 Functional Principle of Format Validation