

Medien / Multimedia

Multimedia

Multimedia nach Steinmetz:

- Perzeptionsmedium: Ableitung von den menschlichen Sinnen Text, Einzelbild, Bewegtbild (visuell)
Musik, Geräusch, Sprache (auditiv)
- Repräsentationsmedium: Informationskodierung im Rechner ASCII, JPEG, PAL
- Präsentationsmedium: Schnittstelle Information – Rechner Papier, Bildschirm, Lautsprecher
(Ausgabemedien) Tastatur, Kamera, Mikrofon (Eingabemedien)
- Speichermedium: Informationsspeicherung Mikrofilm, Papier, Diskette, Festplatte, CD-ROM, Stick
- Übertragungsmedium: Informationsübertragung Koaxialkabel, Glasfaser, Vakuum, TP / CuDA
- Informationsaustauschmedium:
Informationsaustausch Begriff umfaßt alle Speicher- und Übertragungsmedien

Multimedia-Begriff nach YASS:

Multimedia (MM) ist eine Technologie, die verschiedene Medien und Wege verwendet, um bei der Vermittlung von Informationen mehrere Sinnesorgane gleichzeitig anzusprechen. Charakterisierend für eine Multimediaanwendung ist, dass sie mehrere Medien zu einem integralen Gesamtwerk kombiniert. Dabei werden offene, netzwerkartig verknüpfte, nichtlineare Strukturen verwendet.

Multimedia-System

Multimediasystem nach HEYDTHAUSE N

„Multimedia bedeutet

- (1) die Erklärung adäquater Zeichenprozesse
- (2) in der Kommunikation zwischen Zeichengeber und Interpreten
- (3) auf der Basis geeigneter (Zeichen-) Medien
- (4) im digitalen Kontext."

Multimediasystem (im engeren Sinn) nach STEINMETZ:

Ein Multimediasystem ist durch die rechnergesteuerte, integrierte Erzeugung, Manipulation, Darstellung, Speicherung und Kommunikation von unabhängigen Informationen gekennzeichnet, die in mindestens einem kontinuierlichen (zeitabhängigen) und einem diskreten (zeitunabhängigen) Medium kodiert sind.

(im weiteren Sinn: ohne Forderung eines kontinuierlichen Mediums)

MIME-Typen

RFC 1341 MIME (Multipurpose Internet Mail Extensions)
Mechanisms for specifying and describing the format of Internet message bodies.
Borenstein, N.; Freed, N. 1992 June; 69 p. (Format: TXT=211117, PS=347082 bytes)

RFC 1342 Representation of non-ASCII text in Internet message headers.
Moore, K. 1992 June; 7 p. (Format: TXT=15845 bytes)

RFC 4735 Example Media Types for Use in Documentation

RFC 2045, RFC 2046, RFC 2077, RFC 4735, RFC 6838, RFC 4855

MIME-Typen / IANA-Liste: <http://www.iana.org/assignments/media-types/media-types.xhtml>

MIME-Typen / SelfHTML: <http://wiki.selfhtml.org/wiki/MIME-Type/%C3%9Cb%C3%9Cbersicht>

<http://wiki.selfhtml.org/wiki/SELFHTML:Linkliste>

MIME-Typen

MIME unterstützt

- Text, binäre Dateien, Multimedia-Dateien (Audio, Grafik, Video,...)
- multi-part-messages, d.h. Nachrichten die aus mehreren Media-Typen zusammengesetzt sind
- Alternative Display-Typen (d.h. z.B. unformatierten Text für nicht HTML-fähige Mail-Clients und HTML-Mail für HTML-fähige Mail-Clients)

MIME-Notation:= "MIME-Typ / Subtyp"

**MIME-Typ:= { application | audio | video | image | text | webserver | x-world |
multipart | example | message | model }**

Hierbei beschreibt der MIME-Typ die prinzipielle Medienart und der Subtyp die Art der Codierung (das Datenformat / die Representation).

MIME-Typen

[HKEY_LOCAL_MACHINE\SOFTWARE\Denny\WebServer\CurrentVersion\TypeMap]

@="application/octet-stream"

".arj"="application/x-arj"

".au"="audio/basic"

".avi"="video/msvideo"

".bin"="application/octet-stream"

".bmp"="image/x-windows-bmp"

".c"="text/plain"

".cgi"="wwwserver/shellcgi"

".class"="application/x-java-class"

".cpp"="text/plain"

".dcgi"="wwwserver/doscgi"

".def"="text/plain"

".dll"="application/octet-stream"

".doc"="application/msword"

".exe"="application/octet-stream"

".gif"="image/gif"

".gz"="application/x-gzip"

".h"="text/plain"

".hlp"="application/x-winhelp"

".htm"="text/html"

".html"="text/html"

".html-ssi"="wwwserver/html-ssi"

".ini"="text/plain"

".isa"="wwwserver/isapi"

".java"="text/x-java-source"

".jpeg"="image/jpeg"

".jpg"="image/jpeg"

".lnk"="application/x-ms-shortcut"

".js"="application/x-javascript"

".ls"="application/x-javascript"

".lzh"="application/x-lzh"

".map"="wwwserver/imagemap"

".mocha"="application/x-javascript"

".mov"="video/quicktime"

".mpe"="video/mpeg"

".mpeg"="video/mpeg"

".mpg"="video/mpeg"

".pdf"="application/pdf"

".plx"="wwwserver/isapi"

".ps"="application/postscript"

".qt"="video/quicktime"

".ra"="application/x-pn-realaudio"

".ram"="application/x-pn-realaudio"

".rc"="text/plain"

".rtf"="application/rtf"

".rtx"="text/richtext"

".scgi"="wwwserver/shellcgi"

".shtml"="wwwserver/html-ssi"

".snd"="audio/basic"

".tar"="application/x-tar"

".tif"="image/tiff"

".tiff"="image/tiff"

".tsv"="text/tab-separated-values"

".txt"="text/plain"

".url"="wwwserver/redirection"

".vox"="audio/voxware"

".wav"="audio/wav"

".wcgi"="wwwserver/wincgi"

".wri"="application/mswrite"

".wrl"="x-world/x-vrml"

".wsa"="application/wsapi"

".zip"="application/zip"

MIME-Sniffing

MIME-Sniffing: Erkennen des Medientyps einer Datei

MIME-Datenbank: freedesktop.org Standard (XDG)

MIME-Hierarchie: Hierarchie von Medientypen

text/* ist stets auch text/plain

jede Datei ist vom Typ: application/octet-stream

File Format Registries

Ziele von File Format Registries

- Formatidentifizierung
- Formatvalidierung
- Formatdeskription/-charakterisierung
- Formatlieferung/-ausgabe (zusammen mit einem Dokument)
- Formatumformung (z.B. Migration)
- Format-Risikomanagement (bei Wegfall von Formaten)

allg.Problem: Langzeitarchivierung (physisch/Daten-Format)

File Format Registries

- Format-Identifizierung (Welches Format?) z.B. mittels PRONOM-Tool (beispielsweise „DROID“, eine Java Applikation der National Archives von Großbritannien, ebenfalls Urheber von PRONOM - <http://droid.sourceforge.net>)
- Validierung / Gültigkeitsprüfung (Grad der Erfüllung einer Formatspezifikation) z.B. XML Validatoren, die auch in XML Editoren wie „oXygen“ (SyncROSoft Ltd., <http://www.oxygenxml.com>) oder „XMLSpy“ (Altova GmbH, <http://www.altova.com/XMLSpy>)
- Metadatengewinnung mittels z.B. „JHOVE“ (das JSTOR/Harvard Object Validation Environment der Harvard University Library, <http://hul.harvard.edu/jhove/>),
- Formatkorrektur z.B. mittels „PDF/A Live!“ (intarsys consulting GmbH, <http://www.intarsys.de/de/produkte/pdfa-live>)
- Konvertierungstools z.B. mittels „Adobe Acrobat“ (Adobe Systems GmbH, <http://www.adobe.com/de/products/acrobat/>)

File Format Registries

- (I) file-format.net: <http://file-format.net/articles/> (---!!! Autoversicherung)
- (II) FILExt: <http://filext.com/>
- (III) Library of Congress Digital Formats: http://www.digitalpreservation.gov/formats/fdd/browse_list.shtml
- (IV) C.E. Codere's File Format site: <http://magicdb.org/stdfiles.html> (-)
- (V) PRONOM: <http://www.nationalarchives.gov.uk/pronom/>
<http://www.nationalarchives.gov.uk/aboutapps/pronom/droid-signature-files.htm>
- (VI) das Global Digital Format Registry (GDFR): <http://hul.harvard.edu/gdfr/>
- (VIIa) Representation Information Registry Repository: <http://registry.dcc.ac.uk:8080/RegistryWeb/Registry/> (-)
- (VIIb) DCC RI RegRep: <http://twiki.dcc.rl.ac.uk/bin/view/OLD/DCCRegRepV04> (-)
- (VIII) FCLA Data Formats: <http://www.fcla.edu/digitalArchive/pdfs/recFormats.pdf> (-)

File Format Detection Tools

http://www.forensicswiki.org/wiki/File_Format_Identification



- Format detection tools for multimedia files

https://developer.ridgerun.com/wiki/index.php?title=Format_detection_tools_for_multimedia_files



- CheckFileType.com - Free Site to check a file type

<http://checkfiletype.com/>



- Forensic Innovations File Investigator TOOLS

<http://fid3.com/products/fi-tools>



- TrID - File Identifier

<http://mark0.net/soft-trid-e.html>



- PRONOM

- JHOVE

- JHOVE2 (nur mit Anmeldung)

- GDFR <http://hul.harvard.edu/gdfr/>

- UDFR <http://www.udfr.org/>

- **DROID**

Aufgaben

- Erkennen von Dateitypen/MIME-Typ
- Berechnet hash codes:
MD4, MD5, SHA-1, SHA-256, SHA-384 & SHA-512
- Auffinden von Dateien mit Floating Headers
- Extrahieren von Metadaten
- Dateiumbenennung mittels extrahierter Metadaten
- korrigiert falsche Dateierweiterungen
- Detektiert verschlüsselte Dateien inkl. TrueCrypt
- Überblick und statistische Reports

File Format Detection Tools

What is PRONOM?

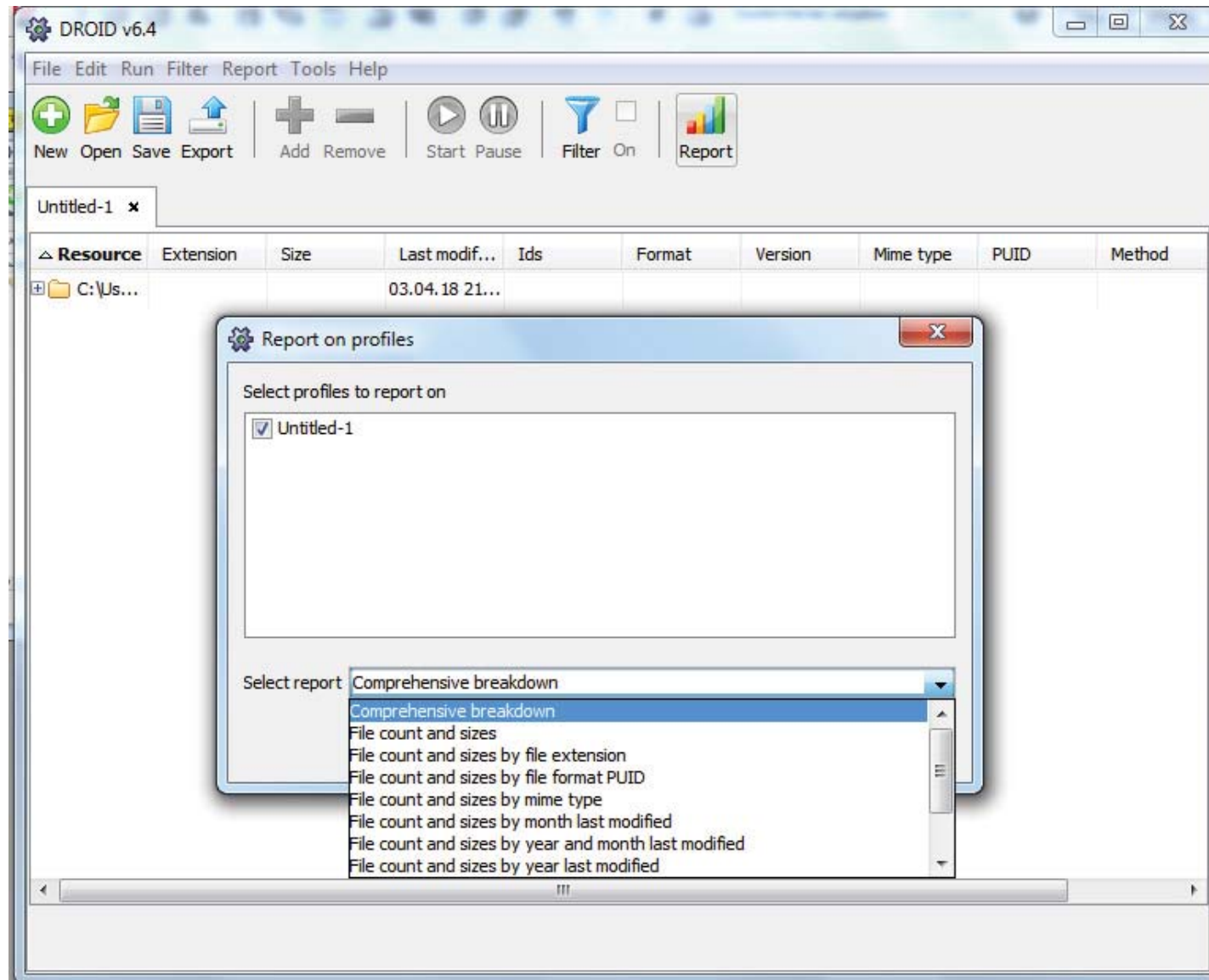
PRONOM is an **on-line information system about data file formats** and their supporting software products. Originally developed to support the accession and long-term preservation of electronic records held by the National Archives, PRONOM is now being made available as a resource for anyone requiring access to this type of information.

DROID (Digital Record Object Identification) is an automatic file format identification tool. It is the first in a planned series of tools developed by The National Archives under the umbrella of its PRONOM technical registry service.

 <http://www.nationalarchives.gov.uk/information-management/manage-information/preserving-digital-records/droid/>

 <https://sourceforge.net/projects/droid/>

 <http://www.nationalarchives.gov.uk/documents/information-management/droid-user-guide.pdf>



Report

| | | | | | |
|-----------------------|-------------|-----------------|------------|---------------|-------------|
| Profile totals | 4893 | 28225462 | 127 | 720243 | 5768 |
|-----------------------|-------------|-----------------|------------|---------------|-------------|

| image/svg+xml | | | | | |
|-----------------------|------------|-----------------|-------------|--------------|--------------|
| Profile | Count | Sum | Min | Max | Average |
| Untitled-1 | 812 | 19813261 | 5178 | 64689 | 24400 |
| Profile totals | 812 | 19813261 | 5178 | 64689 | 24400 |

| image/vnd.microsoft.icon, image/x-icon | | | | | |
|--|----------|--------------|-------------|--------------|-------------|
| Profile | Count | Sum | Min | Max | Average |
| Untitled-1 | 4 | 21672 | 1150 | 15086 | 5418 |
| Profile totals | 4 | 21672 | 1150 | 15086 | 5418 |

| multipart/appledouble | | | | | |
|-----------------------|----------|--------------|------------|--------------|--------------|
| Profile | Count | Sum | Min | Max | Average |
| Untitled-1 | 2 | 39175 | 530 | 38645 | 19587 |
| Profile totals | 2 | 39175 | 530 | 38645 | 19587 |

Export... Close

Report

| eps | | | | | |
|-----------------------|----------|----------------|------------|----------------|----------------|
| Profile | Count | Sum | Min | Max | Average |
| Untitled-1 | 3 | 3133914 | 530 | 1638570 | 1044638 |
| Profile totals | 3 | 3133914 | 530 | 1638570 | 1044638 |

| exe | | | | | |
|-----------------------|------------|-------------------|-------------|-------------------|-----------------|
| Profile | Count | Sum | Min | Max | Average |
| Untitled-1 | 104 | 3591170924 | 6080 | 1245610376 | 34530489 |
| Profile totals | 104 | 3591170924 | 6080 | 1245610376 | 34530489 |

| gif | | | | | |
|-----------------------|-----------|--------------|-----------|--------------|-------------|
| Profile | Count | Sum | Min | Max | Average |
| Untitled-1 | 13 | 46441 | 49 | 10119 | 3572 |
| Profile totals | 13 | 46441 | 49 | 10119 | 3572 |

| gnu | | | | | |
|---------|-------|-----|-----|-----|---------|
| Profile | Count | Sum | Min | Max | Average |

Export... Close

MediaInfo

<http://mediaarea.net/de/MediaInfo>

The image shows two instances of the MediaInfo application. The left window displays the following information:

- Containerformat und allgemeine Informationen
- MPEG-4 (Base Media / Version 2):1,Kodierungs-Datum:UTC 2017-12-2!
- 1 Video-Stream:AVC Tagging-Datum:UTC 2017-12-25 12
- 1 Audio-Stream: AAC Copyright:(c) 2017 3sat
- Erster Video-Stream: Deutsch, 3 199 kb/s, 1280*720 (16:9), bei 25,000 FPS, AVC (Main@L3.1)
- Erster Audio-Stream: Deutsch, 128 kb/s, 48,0 kHz, 2 Kanäle, AAC (LC)

The right window displays the following information:

- Allgemein**
 - Vollständiger Name: E:\HDD_Fujitsu_Notebook_69GBVideos\Mediathek\Musik\Musik-Pa
 - Format: MPEG-4
 - Format-Profil: Base Media / Version 2
 - Codec-ID: mp42 (isom/mp42)
 - Dateigröße: 1,04 GiB
 - Dauer: 45 min 2s
 - Modus der Gesamtbitrate: konstant
 - Gesamte Bitrate: 3 298 kb/s
 - Kodierungs-Datum: UTC 2017-12-25 12:14:22
 - Tagging-Datum: UTC 2017-12-25 12:14:22
 - Copyright: (c) 2017 3sat
- Video**
 - ID: 1
 - Format: AVC
 - Format/Info: Advanced Video Codec
 - Format-Profil: Main@L3.1
 - Format-Einstellungen: CABAC / 5 Ref Frames
 - Format-Einstellungen für CABAC: Ja
 - Format-Einstellungen für RefFrames: 5 frames
 - Format_Settings_GOP: M=2, N=50
 - Codec-ID: avc1
 - Codec-ID/Info: Advanced Video Coding
 - Dauer: 45 min 2s
 - Bitraten-Modus: konstant
 - Bitrate: 3 199 kb/s
 - maximale Bitrate: 4 347 kb/s
 - Breite: 1 280 Pixel
 - Höhe: 720 Pixel
 - Bildseitenverhältnis: 16:9

A context menu is open over the left window, listing the following options:

- Einfach
- Tabelle
- Baumstruktur
- Text
- HTML
- XML
- JSON
- MPEG-7
- PBCore 1.2
- PBCore 2.0
- EBUCore 1.5
- EBUCore 1.6
- EBUCore 1.8 (acq. metadata: parameter then segment)
- EBUCore 1.8 (acq. metadata: segment then parameter)
- EBUCore 1.8 (acq. metadata: parameter then segment, json)
- EBUCore 1.8 (acq. metadata: segment then parameter, json)
- FIMS 1.1 (beta)
- FIMS 1.2 (beta)
- FIMS 1.3 (beta)
- reVTMD
- Benutzerdefiniert

Auswertungsreihenfolge

- explizite MIME-Typ-Angabe
- Magic-Regeln mit einer Priorität von 80 oder höher
- Globbing-Regeln (Vervollständigungen)
- verbleibende Magic-Regeln
- text/plain, wenn die ersten 32 Bytes der Daten keine ASCII-Steuerzeichen enthalten
- application/octet-stream

Tools

UNIX-Kommando: `file -i`

`gnomevfs -info <dateiname>` (schneller Algorithmus ohne Magic-Regeln)

`gnomevfs -info -s <dateiname>` (langsamer Algorithmus mit Magic-Regeln)

Magic Numbers

Ziel: Kennzeichnung von Dateiformaten

BOOTP/DHCP - Magic Cookie: 0x63825363

GIF: GIF89a (0x474946383961) oder GIF87a (0x474946383761)

JPEG/JFIF: 0xFFD8FF + "JFIF" (0x4A464946)

PNG: 0x89504E470D0A1A0A = \211 PNG \r\n\032 \n

MIDI: 0x4D546864 + Metadaten = "MThd"

UNIX-Scripte: 0x2321 = "#!" = Shebang z.B. "#!/usr/bin/perl"

MS-DOS-EXE-Dateien: 0x4D5A = "MZ" (Initialen von Mark Zbikowski)

ELF-Dateien (Executable and Linking Format): 0x7F454D46 = 0x7F + "ELF"

Berkley-Fast-File-System-Superblock: 0x19540119 oder 0x011954

(Geburtsdatum des FS-Designers Kirk McKusick)

Fat Binaries (68k,x86,PowerPC): "Joy!" (0x4A6F7921)

TIFF: "II" (Intel-Endianess) oder "MM" (Motorola-Endianess) + "42" (0x2A00 oder 0x002A)

Dateiformate - Texte

Test_ANSI.txt

```
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 44 61 73 20 69 73 74 20 65 69 6E 20 41 4E 53 49 Das ist ein ANSI
00000010 2D 54 65 78 74 21 0D 0A 4D F6 62 65 72 74 -Text!..Möbert
```

Test_UNICODE.txt

```
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 FF FE 44 00 61 00 73 00 20 00 69 00 73 00 74 00 D.a.s. .i.s.t.
00000010 20 00 65 00 69 00 6E 00 20 00 55 00 4E 00 49 00 .e.i.n. .U.N.I.
00000020 43 00 4F 00 44 00 45 00 2D 00 54 00 65 00 78 00 C.O.D.E.-.T.e.x.
00000030 74 00 21 00 0D 00 0A 00 4D 00 F6 00 62 00 65 00 t.!.....M.ö.b.e.
00000040 72 00 74 00 0D 00 0A 00 r.t.....
```

Test_UNICODE-BE.txt

```
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 FE FF 44 00 61 00 73 00 20 00 69 00 73 00 74 00 by.D.a.s. .i.s.t.
00000010 00 20 00 65 00 69 00 6E 00 20 00 55 00 4E 00 49 .e.i.n. .U.N.I.
00000020 00 43 00 4F 00 44 00 45 00 2D 00 42 00 69 00 67 .C.O.D.E.-.B.i.g
00000030 00 2D 00 45 00 6E 00 64 00 69 00 61 00 6E 00 2D .-.E.n.d.i.a.n.-
00000040 00 54 00 65 00 78 00 74 00 21 00 0D 00 0A 00 4D .T.e.x.t.!.....M
00000050 00 F6 00 62 00 65 00 72 00 74 00 0D 00 0A .ö.b.e.r.t....
```

Test_UTF-8.txt

```
Offset(h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 EF BB BF 44 61 73 20 69 73 74 20 65 69 6E 20 55 Das ist ein U
00000010 54 46 2D 38 2D 54 65 78 74 21 0D 0A 4D C3 B6 62 TF-8-Text!..MÄßb
00000020 65 72 74 0D 0A ert..
```


Dateiformate - Binärformate (1)

| FD RO HxD.exe | | | | | | | | | | | | | | | | | |
|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--------------------|
| Offset (h) | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F | |
| 00000000 | 4D | 5A | 50 | 00 | 02 | 00 | 00 | 00 | 04 | 00 | 0F | 00 | FF | FF | 00 | 00 | MZP... ..ÿÿ.. |
| 00000010 | B8 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 40 | 00 | 1A | 00 | 00 | 00 | 00 | 00 | ,.....@..... |
| 00000020 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | |
| 00000030 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 01 | 00 | 00 | |
| 00000040 | BA | 10 | 00 | 0E | 1F | B4 | 09 | CD | 21 | B8 | 01 | 4C | CD | 21 | 90 | 90 | °.....'.í!.,.Lí!.. |
| 00000050 | 54 | 68 | 69 | 73 | 20 | 70 | 72 | 6F | 67 | 72 | 61 | 6D | 20 | 6D | 75 | 73 | This program mus |
| 00000060 | 74 | 20 | 62 | 65 | 20 | 72 | 75 | 6E | 20 | 75 | 6E | 64 | 65 | 72 | 20 | 57 | t be run under W |
| 00000070 | 69 | 6E | 33 | 32 | 0D | 0A | 24 | 37 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | in32..\$7..... |

| FD RO Mappe 2.xlsx | | | | | | | | | | | | | | | | | |
|--------------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------------------|
| Offset (h) | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F | |
| 00000000 | 50 | 4B | 03 | 04 | 14 | 00 | 06 | 00 | 08 | 00 | 00 | 00 | 21 | 00 | 73 | 41 | PK.....!.sA |
| 00000010 | B3 | 9D | 8E | 01 | 00 | 00 | 9C | 06 | 00 | 00 | 13 | 00 | D6 | 01 | 5B | 43 | ³.Ž...æ.....Ö.[C |
| 00000020 | 6F | 6E | 74 | 65 | 6E | 74 | 5F | 54 | 79 | 70 | 65 | 73 | 5D | 2E | 78 | 6D | ontent_Types].xm |
| 00000030 | 6C | 20 | A2 | D2 | 01 | 28 | A0 | 00 | 02 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | l ¢Ò.(..... |

| FD RO VP8.pdf | | | | | | | | | | | | | | | | | |
|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------------------|
| Offset (h) | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F | |
| 00000000 | 25 | 50 | 44 | 46 | 2D | 31 | 2E | 34 | 0A | 25 | D3 | EB | E9 | E1 | 0A | 31 | PDF-1.4 %Óëéá.1 |
| 00000010 | 20 | 30 | 20 | 6F | 62 | 6A | 0A | 3C | 3C | 2F | 43 | 72 | 65 | 61 | 74 | 6F | 0 obj.<</Creato |
| 00000020 | 72 | 20 | 28 | 43 | 68 | 72 | 6F | 6D | 69 | 75 | 6D | 29 | 0A | 2F | 50 | 72 | r (Chromium)./Pr |
| 00000030 | 6F | 64 | 75 | 63 | 65 | 72 | 20 | 28 | 53 | 6B | 69 | 61 | 2F | 50 | 44 | 46 | oducer (Skia/PDF |

Dateiformate - Binärformate (2)

 Baum_01.ps

```

Offset (h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 25 21 50 53 2D 41 64 6F 62 65 2D 33 2E 30 0D 0A !PS-Adobe-3.0 .
00000010 25 25 43 72 65 61 74 6F 72 3A 20 67 72 61 70 68 %%Creator: graph
00000020 76 69 7A 20 76 65 72 73 69 6F 6E 20 32 2E 32 38 viz version 2.28
00000030 2E 30 20 28 32 30 31 31 30 35 30 37 2E 30 33 32 .0 (20110507.032
00000040 37 29 0D 0A 25 25 54 69 74 6C 65 3A 20 62 61 75 7)..%%Title: bau


```

 Briefkopf.doc

```

Offset (h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 D0 CF 11 E0 A1 B1 1A E1 00 00 00 00 00 00 00 00 Āī.à;±.á.....
00000010 00 00 00 00 00 00 00 00 3E 00 03 00 FE FF 09 00 .....>...pÿ..
00000020 06 00 00 00 00 00 00 00 00 00 00 00 20 00 00 00 .....
00000030 E3 0F 00 00 00 00 00 00 10 00 00 E6 0F 00 00 ä.....æ...
00000040 01 00 00 00 FE FF FF FF 00 00 00 00 C3 0F 00 00 ....pÿÿÿ....Ā...

```


 audacity-win-2.1.2.zip

```


Offset (h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 50 4B 03 04 14 00 00 00 00 00 E5 11 2D 48 00 00 PK.....å.-H..
00000010 00 00 00 00 00 00 00 00 00 00 09 00 00 00 41 75 .....Au
00000020 64 61 63 69 74 79 2F 50 4B 03 04 14 00 00 00 08 dacity/PK.....
00000030 00 76 68 29 48 F3 79 60 C8 E4 77 2C 00 00 B8 8D .vh)Hóy`Èäw,...
00000040 00 15 00 00 00 41 75 64 61 63 69 74 79 2F 61 75 .....Audacity/au
00000050 64 61 63 69 74 79 2E 65 78 65 EC 9D 7D 60 1C 45 dacity.exeì.}`.E

```

Dateiformate - Audio


 Adele_20161015_Gitarre_1.wav

| Offset (h) | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F | |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------------------------|
| 00000000 | 52 | 49 | 46 | 46 | 24 | 5C | E7 | 01 | 57 | 41 | 56 | 45 | 66 | 6D | 74 | 20 | RIFF \$.WAVEfmt |
| 00000010 | 10 | 00 | 00 | 00 | 01 | 00 | 02 | 00 | 44 | AC | 00 | 00 | 10 | B1 | 02 | 00 |D-...±.. |
| 00000020 | 04 | 00 | 10 | 00 | 64 | 61 | 74 | 61 | 00 | 5C | E7 | 01 | 01 | 00 | E5 | FE |data.\ç...åþ |
| 00000030 | 00 | 00 | EC | FE | 03 | 00 | EB | FE | FF | FF | 05 | FF | 04 | 00 | 0A | FF | ..ip..ëþÿÿ.ÿ...ÿ |


 Eric_Clapton-Tears_on_Heaven.mp3

| Offset (h) | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 0A | 0B | 0C | 0D | 0E | 0F | |
|------------|-----------|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------------------|
| 00000000 | FF | FB | 30 | 64 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | ÿü.d..... |
| 00000010 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | |
| 00000020 | 00 | 00 | 00 | 00 | 58 | 69 | 6E | 67 | 00 | 00 | 00 | 0F | 00 | 00 | 27 | F1 |Xing.....'ñ |
| 00000030 | 00 | 56 | A6 | ED | 00 | 03 | 05 | 08 | 0B | 0D | 10 | 13 | 15 | 17 | 1A | 1D | .V i..... |
| 00000040 | 1F | 22 | 24 | 26 | 2A | 2C | 2E | 31 | 33 | 36 | 39 | 3B | 3E | 40 | 43 | 46 | ."\$&*,.1369;>@CF |


Dateiformate - Grafik

 arrow_colapse.bmp


```
Offset (h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 42 4D 06 0C 00 00 00 00 00 00 36 00 00 00 28 00 BM.....6... (
00000010 00 00 30 00 00 00 15 00 00 00 01 00 18 00 00 00 ..0.....
00000020 00 00 D0 0B 00 00 00 00 00 00 00 00 00 00 00 00 ..Ð.....
00000030 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
```

 floppybuddy.gif

```
Offset (h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 47 49 46 38 39 61 50 00 46 00 F7 80 00 00 00 00 GIF89aP F.÷€....
00000010 01 01 01 02 02 02 03 03 03 04 04 04 05 05 05 06 .....
```

 d5300_16p_Seite_1.jpg

```
Offset (h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 FF D8 FF E0 00 10 4A 46 49 46 00 01 01 01 00 DA ÿÿÿ..JFIF... Ú
00000010 00 D1 00 00 FF E2 0C 58 49 43 43 5F 50 52 4F 46 .Ñ..ÿâ.XICC_PROF
00000020 49 4C 45 00 01 01 00 00 0C 48 4C 69 6E 6F 02 10 ILE.....HLino..
00000030 00 00 6D 6E 74 72 52 47 42 20 58 59 5A 20 07 CE ..mnrRGB XYZ .Ï
00000040 00 02 00 09 00 06 00 31 00 00 61 63 73 70 4D 53 .....1..acspMS
```

 wordcloud_namen.png

```
Offset (h) 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
00000000 89 50 4E 47 0D 0A 1A 0A 00 00 00 0D 49 48 44 52 PNG... ...IHDR
00000010 00 00 0B 02 00 00 05 72 08 06 00 00 00 08 8D A8 .....r....."
00000020 06 00 00 00 04 73 42 49 54 08 08 08 08 7C 08 64 .....sBIT....|.d
00000030 88 00 00 00 09 70 48 59 73 00 00 2E 21 00 00 2E ^....pHYs...!...
00000040 21 01 07 5B FC FF 00 00 00 19 74 45 58 74 53 6F !..[üÿ....tEXtSo
00000050 66 74 77 61 72 65 00 77 77 77 2E 69 6E 6B 73 63 ftware.www.inksc
00000060 61 70 65 2E 6F 72 67 9B EE 3C 1A 00 00 20 00 49 ape.org>i<... .I
```


Medien-Meta-Daten

Ontologien

Ontologien / Medienbeschreibungen

Ontology

= formal naming and definition of the types, properties, and interrelationships of entities eines universe of discourse/universal set/universe

Web Ontology Language (OWL)

- formale Beschreibungssprache für Ontologien vom World Wide Web Consortiums (W3C)
- Bestandteil der Semantic-Web-Initiative von Tim Berners-Lee
- basiert auf Resource Description Framework (RDF, engl. sinngemäß „System zur Beschreibung von Ressourcen“)

 https://de.wikipedia.org/wiki/Web_Ontology_Language

 https://de.wikipedia.org/wiki/Resource_Description_Framework

Visual Notation for OWL Ontologies (VOWL)

 <http://vowl.visualdataweb.org/>

versus: Taxonomien/taxonomic hierarchies of classes

Ontologien beschränken sich nicht nur auf Hierarchien

Ontologien / Medienbeschreibungen

Typen von Ontologien

domain ontology (or domain-specific ontology): spezifische domain-Ontologie

z.B.

FOAF (Friend Of A Friend) ontology: <http://www.foaf-project.org/>

SIOC (Socially Interconnected Online Communities) ontology:

<http://sioc-project.org/>

Good Relations Ontology mit 27 classes, 43 object properties, 37 datatype properties, 43 individuals

<http://www.heppnetz.de/projects/goodrelations/>

Music Ontology: <http://musicontology.com/>

MarineTLO ontology: <http://www.ics.forth.gr/isl/MarineTLO/>

92 classes, 41 properties

Ontologien / Medienbeschreibungen

Typen von Ontologien

upper ontology (or foundation ontology): allgemeine Objekte für viele Domain Ontologien

https://en.wikipedia.org/wiki/Upper_ontology

BFO (Basic Formal Ontology): https://en.wikipedia.org/wiki/Basic_formal_ontology

<http://basic-formal-ontology.org/> (Homepage)

BORO method (Business Objects Reference Ontology): https://wikivisually.com/wiki/BORO_method

Dublin Core (DC) ontology: Dublin Core Metadata Element Set (DCMES)

def. 15 Metadata Elements

<http://dublincore.org/> , https://en.wikipedia.org/wiki/Dublin_Core

IETF RFC 5013, ISO 15836-2009, NISO Standard Z39.85

GFO (General Formal Ontology): https://en.wikipedia.org/wiki/General_formal_ontology

OpenCyc/ResearchCyc - Wissensdatenbank des Alltagswissen seit 1984:

<https://de.wikipedia.org/wiki/Cyc>

SUMO (Suggested Upper Merged Ontology) für computer information processing systems:

https://en.wikipedia.org/wiki/Suggested_Upper_Merged_Ontology

Unified Foundational Ontology (UFO): <https://oxygen.informatik.tu-cottbus.de/drupal7/ufo/>

DOLCE (Descriptive Ontology for Linguistic and Cognitive Engineering):

<http://www.loa.istc.cnr.it/old/DOLCE.html>

WordNet (lexical database for the English language): <https://en.wikipedia.org/wiki/WordNet>

Ontologien / Medienbeschreibungen

Typen von Ontologien

hybrid ontology (z.B. Gellish): <https://en.wikipedia.org/wiki/Gellish>

Naming Tables - Fact Tables - Message Tables

Ontology engineering (or ontology building):

Teil der Wissensverarbeitung (Knowledge Engineering)

OntoUML (Ontology UML-Erweiterung): <https://en.wikipedia.org/wiki/OntoUML>

Ontologien (Quellen)

[https://encyclopedia.thefreedictionary.com/Ontology+\(computer+science\)](https://encyclopedia.thefreedictionary.com/Ontology+(computer+science))

<http://lov.okfn.org/dataset/lov/vocabs?tag=Multimedia>

Medienbeschreibungen

Meta-Data

Medieninformationen

Metadaten = Daten über Daten

Metadaten-Modell = detaillierte Beschreibung einer Datenstruktur und ihrer Darstellung

<http://www.itwissen.info/Metadaten-Modell-meta-data-model.html>

<http://www.itwissen.info/Datenqualitaet-data-quality.html>

Exchangeable Image File (EXIF): ISO 12234-1

https://de.wikipedia.org/wiki/Exchangeable_Image_File_Format



JEIDA (Japan electronic industry development association) <http://www.jeida.or.jp/>

für Metainformationen von Fotos und deren Bearbeitung



International Press Telecommunications Council (IPTC):

vorher Information Interchange Model (IIM)

International Press Telecommunications Council (IPTC)

Newspaper Association of America (NAA)

für Hinweise und Kommentare

Extensible Metadata Platform (XMP):

fortotechnische Angaben

Meta Information Encapsulation (MIE)

| Grafikformat | Metadatenformat | | |
|------------------|-----------------|------|-----|
| | EXIF | IPTC | XMP |
| RAW (NEF) | x | x | x |
| DNG | x | x | x |
| TIFF | x | x | x |
| PNG | - | - | x |
| JPEG | x | x | x |
| JPEG2000 | x | x | x |

Medieninformationen

Ontologien

<http://lov.okfn.org/dataset/lov/vocabs?tag=Multimedia>

W3C - MediaOnt

Media Annotation (MA-ONT) ontology

<https://dev.w3.org/2008/video/mediaann/mediaont-1.0/mediaont-1.0.html>

OntoMedia Being Representation (being)

<http://lov.okfn.org/dataset/lov/vocabs/being>

media resource

Uniform Resource Identifier (URI): Generic Syntax

<https://www.rfc-editor.org/pdf/rfc3986.txt.pdf>

<https://dev.w3.org/2008/video/mediaann/mediaont-1.0/mediaont-1.0.html#rfc3986>

vocab.org - A URI space for vocabularies



Media Ontology

media ontology

media ontology **rdf**

w3c media ontology

media **contract** ontology

media **resource** ontology

media **value chain** ontology

lash new media ontology

social media ontology

new media ontology

mass media ontology

Medieninformationen

- HTML
- XML
- MPEG-7
- PBCore
- DC (Dublin Core)
- CL11 (CableLabs 1.1)
- DIG35
- EBUCore: <https://tech.ebu.ch/MetadataEbuCore>
- FIMS (Framework for Interoperable Media Services) - <https://www.fims.tv/>
- reVTMD
- EXIF
- ID3
- IPTC
- RDF (Resource Description Framework) - <http://www.w3.org/RDF/>
- TTML (Timed Text Markup Language) - <http://www.w3.org/TR/2010/REC-ttaf1-dfxp-20101118/>
- LOM21
- MRSS (Media RSS)
- OGG
- QT
- DMS-1
- TV-Anytime
- TXFeed
- XMP (Extensible Metadata Platform - Adobe)
- YT (YouTube Data API Protocol)

Medieninformationen

3GP - <http://www.3gpp.org/specifications>
Cablelabs - <http://www.cablelabs.com/specifications/MD-SP-VOD-CONTENT1.1-I05-060831.pdf>
DIG35 (Metadata for Digital Image) - <http://www.bgbm.org/TDWG/acc/Documents/DIG35-v1.1WD-010416.pdf>
DMS-1 - <http://www.smpete.org/standards>
Dublin Core - <http://dublincore.org/documents/dcmi-terms/>
EBUCore - <http://tech.ebu.ch/publications/tech3293>
EXIF - <http://www.exif.org/Exif2-2.PDF>
Flash - http://download.macromedia.com/f4v/video_file_format_spec_v10_1.pdf
ID3 - http://www.id3.org/Developer_Information
MP4 (ISO/IEC 14496-14) - http://www.iso.org/iso/catalogue_detail.htm?csnumber=38538
MPEG-7 - http://www.chiariglione.org/mpeg/working_documents/mpeg-07/schema_def/cd.zip
TV-Anytime - ETSI 102 822-3-1 V1.4.1. November 2007
SMPTE - <http://www.smpete-ra.org/mdd/RP210v11-pub-20080415.2048.xls>
Ogg container format - <http://www.xiph.org/ogg/>
OWL 2 Web Ontology Language Profiles. W3C OWL Working Group - <http://www.w3.org/TR/owl2-profiles/>
QuickTime - <http://developer.apple.com/mac/library/documentation/QuickTime/QTFF/QTFFPreface/qtffPreface.html>
WebM - <http://www.webmproject.org/code/specs/container/>
XMP (XMP Toolkit SDK / Adobe Bridge) - <http://www.adobe.com/content/dam/Adobe/en/devnet/xmp/pdfs/XMPSpecificationPart1.pdf>
<http://www.adobe.com/content/dam/Adobe/en/devnet/xmp/pdfs/XMPSpecificationPart2.pdf>
<https://helpx.adobe.com/de/bridge/using/metadata-adobe-bridge.html>
YouTube Data API Protocol - <http://code.google.com/intl/en/apis/youtube/2.0/reference.html>
MIME - <http://www.ietf.org/rfc/rfc2046.txt>
The Codecs Parameter for "Bucket" Media Types - <http://www.ietf.org/rfc/rfc4281.txt>

EBU Medieninformationen

EBU = EUROPEAN BROADCASTING UNION IS THE WORLD'S LEADING ALLIANCE OF PUBLIC SERVICE MEDIA

EBUCore - <https://tech.ebu.ch/docs/tech/tech3293.pdf>

EBU Class Conceptual Data Model (CCDM)

= framework for descriptive and technical metadata for use in service orientated architectures and audiovisual ontologies for semantic web and linked data developments

Metadata Specification

<https://tech.ebu.ch/MetadataEbuCore>

<https://www.itu.int/rec/R-REC-BS.2076-0-201506-I/en>

EBUCore RDF= Erweiterung von CCDM für business objects

siehe Linked Open Vocabulary (LOV) (http://lov.okfn.org/dataset/lov/details/vocabulary_ebucore.html)

<http://id.loc.gov/vocabulary/iso639-2/eng.html>

<http://id.loc.gov/vocabulary/iso639-2/gem.json>

EBU Namespace (RFC 5174)

Uniform Resource Name (URN) namespace for the European Broadcasting Union (EBU)

for naming persistent resources

MINT mapping tool von der NTUA University of Athens

Metadata Interoperability (MINT) toolset

<https://ebu.io/ioprojects/mint>

Audio Definition Model (ADM)

<https://tech.ebu.ch/docs/tech/tech3364.pdf>

Medieninformationen

Media-Deskriptoren-Kategorien

- Identifikation
- Creation
- Content description
- Relation/Bezüge
- Rights/Rechte
- Distribution/Verteilung
- Fragmente
- Technische Eigenschaften

Media-Deskriptoren

metadata standards (XSD)

- title
- alternative title
- creator
- subject
- description
- publisher
- date
- type
- identifier
- language
- frame size
- duration
- compression
- format
- samplingRate
- frameRate
- averageBitRate
- numTracks

Medieninformationen

Online Analytical Processing (OLAP)

https://de.wikipedia.org/wiki/Online_Analytical_Processing



ROLAP (relational OLAP)

<http://www.itwissen.info/ROLAP-relational-OLAP.html>



Speicherung von multidimensionalen Datenstrukturen basierend auf dem sogenannten OLAP-Würfel (OLAP-Cube / Datenwürfel)

- gebräuchlicher Begriff zur logischen Darstellung von Data-Warehouse-Daten
- z.B. Zeit -- Kunde -- Produkt

<https://de.wikipedia.org/wiki/OLAP-W%C3%BCrfel>



Medieninformationen auslesen ...

The screenshot shows the MediaArea.net/MediaInfo application window displaying information for the file 'E:\HDD_Fujitsu_Notebook_69GB\Videos\Musik\Westlife - You raise me up_(Sturmflut)_DivX52_4000kbps.avi'. The application shows the container format and general information, including the video and audio streams.

The command prompt window shows the output of the 'ffprobe' command, which provides detailed information about the video and audio streams, including duration, bitrate, and stream parameters.

```

C:\Windows\system32\cmd.exe
--enable-libva --enable-libvdpau --enable-libx264 --enable-libx265 --enable-
libxavs --enable-libxvid --enable-libxml2 --enable-libzimg --enable-lzma --enab
le-zlib
libavutil      55. 76.100 / 55. 76.100
libavcodec     57.106.101 / 57.106.101
libavformat    57. 82.101 / 57. 82.101
libavdevice    57.  8.101 / 57.  8.101
libavfilter    6.105.100 / 6.105.100
libswscale     4.  7.103 / 4.  7.103
libswresample  2.  8.100 / 2.  8.100
libpostproc   54.  6.100 / 54.  6.100
Input #0, avi, from 'Westlife - You raise me up_(Sturmflut)_DivX52_4000kbps.avi':
  Duration: 00:03:58.81, start: 0.000000, bitrate: 3336 kb/s
    Stream #0:0: Video: mpeg4 (DX50 / 0x30355844), yuv420p, 720x576 [SAR 1:1 DAR
    5:4], 3286 kb/s, 25 fps, 25 tbr, 25 tbn, 30k tbc
    Stream #0:1: Audio: mp3 (U101101101 / 0x0055), 24000 Hz, stereo, s16p, 40 kb
    /s
E:\HDD_Fujitsu_Notebook_69GB\Videos\Musik>ren coders: -c libxvid msmpeg4
E:\HDD_Fujitsu_Notebook_69GB\Videos\Musik>ren https://ffmpeg.org/ffmpeg.html
E:\HDD_Fujitsu_Notebook_69GB\Videos\Musik>pause
Drücken Sie eine beliebige Taste . . .

```

Medieninfo

MediaArea.net

ffprobe

<https://ffmpeg.org/ffmpeg.html>

EXIF (193 EXIF-Parameter in CANON-Camera - Fotos)

Shutter-AELock : AF/AE lock
 YResolution : 72
 MeteringMode : Evaluative
 ColorTempShade : 7000
 ExifImageLength : 2304
 ThumbnailImage : (Binary data)
 FocusDistanceUpper : 0
 ToningEffect : None
 ColorTone : Normal
 XResolution : 72
 PictureStyle : None
 ColorTempDaylight : 5200
 Self-timer2 : 0
 FocalLength35efl : 18.0mm (35mm equivalent:28.1mm)
 WB_RGGBLevelsCustom1 : 2155 1023 1023 1497
 ColorTempAuto : 6105
 WB_RGGBLevelsCustom2 : 2155 1023 1023 1497
 ColorHue : 0
 FlashOn : Off
 Make : Canon
 CanonImageHeightAsShot : 2304
 YResolution (1) : 72
 DigitalZoom : None
 Compression : JPEG (old-style)
 WB_RGGBLevelsShade : 2494 1023 1023 1250
 HyperfocalDistance : 1.20 m
 ColorTempFluorescent : 3895
 FlashSyncSpeedAv : Auto
 FileName : 20070725-0859_Kroatien.JPG
 ColorTempCustom1 : 5200
 ResolutionUnit (1) : inches
 ColorTempCustom2 : 5200
 ComponentsConfiguration : YCbCr
 TargetAperture : 14
 ScaleFactor35efl : 1.6
 BaseISO : 400
 ISO (1) : 400
 ResolutionUnit : inches
 ExposureMode : Auto
 OpticalZoomCode : 8
 MeasuredEV : 9.38
 WhiteBalanceBlue : 0
 SerialNumber : 0330117467
 FocusRange : Not Known
 SensorRedLevel : 0
 CanonFlashMode : Red-eye reduction (Auto)
 WB_RGGBLevelsAuto : 2354 1023 1023 1439
 CameraType : EOS Mid-range
 Saturation : +1
 WBShiftGM : 0
 BracketMode : Off
 SensorLeftBorder : 52
 Self-timer : 0
 SetButtonCrossKeysFunc : Normal
 OriginalDecisionData : 0
 CanonImageHeight : 2304
 Model : Canon EOS 350D DIGITAL
 PhotoEffect : Off

ExifImageWidth : 3456
 ToneCurve : Standard
 SlowShutter : None
 MacroMode : Normal
 AFPointsUsed : Left, Mid-left, Mid-right, Right
 ZoomTargetWidth : 0
 AEBBracketValue : 0
 DriveMode : Single-frame shooting
 Lens : 18.0 - 200.0mm
 DigitalGain : 0
 ColorTempCloudy : 6000
 BlueBalance : 1.412169
 Quality : Fine
 FocalPlaneXSize : 23.04mm
 CanonFirmwareVersion : Firmware 2.0.0
 CreateDate : 2007:07:25 07:59:24
 FilterEffect : None
 ETTLII : Evaluative
 ApertureValue : 14.0
 ZoomSourceWidth : 0
 WB_RGGBLevelsCloudy : 2328 1023 1023 1357
 ColorSpace : sRGB
 DateTimeOriginal : 2007:07:25 07:59:24
 ThumbnailOffset : 9728
 RedBalance : 2.310108
 AutoISO : 100
 FileType : JPEG
 ExposureTime : 1/500
 ColorTempAssShot : 6105
 Directory : .
 FocalLength : 18.0mm
 ImageHeight : 2304
 WBShiftAB : 0
 SensorRightBorder : 3507
 FlashpixVersion : 0100
 WB_RGGBLevelsAsShot : 2354 1019 1019 1439
 BracketShotNumber : 0
 FocalPlaneYResolution : 3958.763
 AFAssistBeam : Emits
 LongFocal : 200mm
 NDFilter : Unknown (-1)
 FocalUnits : 1
 EasyMode : Full auto
 SensorWidth : 3516
 WBBracketValueGM : 0
 WB_RGGBLevels : 2354 1019 1019 1439
 UserComment :
 NumAFPoints : 7
 FocalPlaneXResolution : 3954.233
 ExposureLevelIncrements : 1/3 Stop
 NoiseReduction : Off
 RecordMode : JPEG
 LensType : Unknown (-1)
 WhiteBalance : Auto
 FlashBits : (none)
 WBBracketMode : Off
 FNumber : 14.0
 WhiteBalance (1) : Auto
 WB_RGGBLevelsTungsten : 1480 1023 1023 2338
 ISO : 400
 FocusDistanceLower : 0
 ColorTempFlash : 6456
 CanonImageType : Canon EOS 350D DIGITAL
 FocalPlaneYSize : 15.37mm
 ShootingMode : Full auto
 ContinuousDrive : Single
 AutoRotate : None
 ExposureCompensation : 0

ShutterSpeedValue : 1/500
 SensorTopBorder : 19
 MeteringMode (1) : Multi-segment
 TargetExposureTime : 1/501
 Sharpness : +1
 WBBracketValueAB : 0
 ColorTempTungsten : 3195
 WB_RGGBLevelsFlash : 2408 1023 1023 13
 SensorBlueLevel : 0
 SerialNumberFormat : Format 2
 LightValue : 14.6
 FNumber (1) : 13
 Contrast : +1
 ImageWidth : 3456
 FlashExposureComp : 0
 ExposureTime (1) : 1/481
 AutoExposureBracketing : Off
 ExposureCompensation (1) : 0
 CanonExposureMode : Easy
 FocalType : Zoom
 Aperture : 14.0
 MIMEType : image/jpeg
 ExposureProgram : Program AE
 CanonImageWidth : 3456
 ExifToolVersion : 6.90
 CustomRendered : Normal
 FileSize : 4 MB
 InteropVersion : 0100
 FocusMode : AI Focus AF
 MirrorLockup : Disable
 FocusContinuous : Single
 Flash : Off
 FlashActivity : 0
 SensorBottomBorder : 2322
 WhiteBalanceRed : 0
 SensorHeight : 2328
 WB_RGGBLevelsFluorescent : 1841 1023 1023 19
 SceneCaptureType : Standard
 Lens35efl : 18.0 - 200.0mm (3
 LongExposureNoiseReduction : Off
 ThumbnailLength : 9728
 ImageSize : 3456x2304
 FocalPlaneResolutionUnit : inches
 BracketValue : 0
 CanonImageWidthAsShot : 3456
 FileNumber : 102-0292
 FileModifyDate : 2007:07:25 07:59:
 ShortFocal : 18mm
 YCbCrPositioning : Co-sited
 ModifyDate : 2007:07:25 07:59:
 SequenceNumber : 0
 BulbDuration : 0
 CanonModelID : EOS Digital Rebel
 Orientation : Horizontal (norma
 SharpnessFrequency : n/a
 InteropIndex : R98 - DCF basic f
 XResolution (1) : 72
 OwnerName : unknown
 ExifVersion : 0221
 FlashGuideNumber : 0
 FocalLength (1) : 18mm
 ShutterCurtainSync : 1st-curtain sync
 ShutterSpeed : 1/500
 ColorTemperature : 5200
 CanonImageSize : Large
 CircleOfConfusion : 0.019 mm
 WB_RGGBLevelsDaylight : 2155 1023 1023 14

EXIF (193 EXIF-Parameter in CANON-Camera - Fotos)

Shutter-AELock, YResolution, MeteringMode, ColorTempShade, ExifImageLength, ThumbnailImage, FocusDistanceUpper, ToningEffect, ColorTone, XResolution, PictureStyle, ColorTempDaylight, Self-timer2, FocalLength35efl, WB_RGGBLevelsCustom1, ColorTempAuto, WB_RGGBLevelsCustom2, ColorHue, FlashOn, Make, CanonImageHeightAsShot, YResolution (1), DigitalZoom, Compression, WB_RGGBLevelsShade, HyperfocalDistance, ColorTempFluorescent, FlashSyncSpeedAv, FileName, ColorTempCustom1, ResolutionUnit (1), ColorTempCustom2, ComponentsConfiguration, TargetAperture, ScaleFactor35efl, BaseISO, ISO (1), ResolutionUnit, ExposureMode, OpticalZoomCode, MeasuredEV, WhiteBalanceBlue, SerialNumber, FocusRange, SensorRedLevel, CanonFlashMode, WB_RGGBLevelsAuto, CameraType, Saturation, WBShiftGM, BracketMode, SensorLeftBorder, Self-timer, SetButtonCrossKeysFunc, OriginalDecisionData, CanonImageHeight, Model, PhotoEffect, ExifImageWidth, ToneCurve, SlowShutter, MacroMode, AFPointsUsed, ZoomTargetWidth, AEBBracketValue, DriveMode, Lens, DigitalGain, ColorTempCloudy, BlueBalance, Quality, FocalPlaneXSize, CanonFirmwareVersion, CreateDate, FilterEffect, ETTLII, ApertureValue, ZoomSourceWidth, WB_RGGBLevelsCloudy, ColorSpace, DateTimeOriginal, ThumbnailOffset, RedBalance, AutoISO, FileType, ExposureTime, ColorTempAsShot, Directory, FocalLength, ImageHeight, WBShiftAB, SensorRightBorder, FlashpixVersion, WB_RGGBLevelsAsShot, BracketShotNumber, FocalPlaneYResolution, AFAssistBeam, LongFocal, NDFilter, FocalUnits, EasyMode, SensorWidth, WBBracketValueGM, WB_RGGBLevels, UserComment, NumAFPoints, FocalPlaneXResolution, ExposureLevelIncrements, NoiseReduction, RecordMode, LensType, WhiteBalance, FlashBits, WBBracketMode, FNumber, WhiteBalance (1), WB_RGGBLevelsTungsten, ISO, FocusDistanceLower, ColorTempFlash, CanonImageType, FocalPlaneYSize, ShootingMode, ContinuousDrive, AutoRotate, ExposureCompensation, ShutterSpeedValue, SensorTopBorder, MeteringMode (1), TargetExposureTime, Sharpness, WBBracketValueAB, ColorTempTungsten, WB_RGGBLevelsFlash, SensorBlueLevel, SerialNumberFormat, LightValue, FNumber (1), Contrast, ImageWidth, FlashExposureComp, ExposureTime (1), AutoExposureBracketing, ExposureCompensation (1), CanonExposureMode, FocalType, Aperture, MIMEType, ExposureProgram, CanonImageWidth, ExifToolVersion, CustomRendered, FileSize, InteropVersion, FocusMode, MirrorLockup, FocusContinuous, Flash, FlashActivity, SensorBottomBorder, WhiteBalanceRed, SensorHeight, WB_RGGBLevelsFluorescent, SceneCaptureType, Lens35efl, LongExposureNoiseReduction, ThumbnailLength, ImageSize, FocalPlaneResolutionUnit, BracketValue, anonImageWidthAsShot, FileNumber, FileModifyDate, ShortFocal, CbCrPositioning, ModifyDate, SequenceNumber, BulbDuration, CanonModelID, Orientation, SharpnessFrequency, InteropIndex, XResolution (1), OwnerName, ExifVersion, FlashGuideNumber, FocalLength (1), ShutterCurtainSync, ShutterSpeed, ColorTemperature, CanonImageSize, CircleOfConfusion, WB_RGGBLevelsDaylight

Perl Script zu Auslesen von EXIF

The Image::ExifTool Perl Library Module

- read and write meta information in a wide variety of image, audio and video files

```

sub printexif()
{print EXIF"##### $datei #####\n";
  my $info = ImageInfo("$datei");
  foreach (keys %$info) {
    my $val = $$info{$_};
    if (ref $val eq 'ARRAY') {
      $val = join(', ', @$val);
    } elsif (ref $val eq 'SCALAR') {
      $val = '(Binary data)';
    }
    printf(EXIF"%-24s : %s\n", $_, $val);
  }
  print EXIF"\n";
}

use Image::ExifTool qw(:Public);
opendir(DIR1, ".");
@dir0=readdir(DIR1);
$anz=0;open(EXIF, ">_EXIF.txt");
foreach $datei (@dir0) {
  $_=$datei;
  if (/[J,j][P,p][G,g]/) {
    my $info = ImageInfo("$datei");
    &printexif();
  }
}

#Konstruiere Dateinamen
foreach (keys %$info) { my $val = $$info{$_};
  if ($_ eq 'CreateDate') {print $_, ":", $val, "\n";}
  if ($_ eq 'CreateDate') {($d,$t)=split(/ /,$val);
    print "Datum=", $d, " Zeit=", $t, "\n";}
  ($jjjj,$mm,$tt)=split(/:/,$d);
  ($std,$min,$sec)=split(/:/,$t);
  #$std=$std+1; if ($std <= 9) {$std="0$std";} #eine Stunde später
}

```