



**HOCHSCHULE
MITTWEIDA**
University of Applied Sciences

Private Information in Public Data

A Forensic Analysis of Unaffected User Image Metadata Provided by Online Platforms

IARIA INTERNET 2026

Felix Fischer, Elisabeth Ziesch, Dirk Labudde

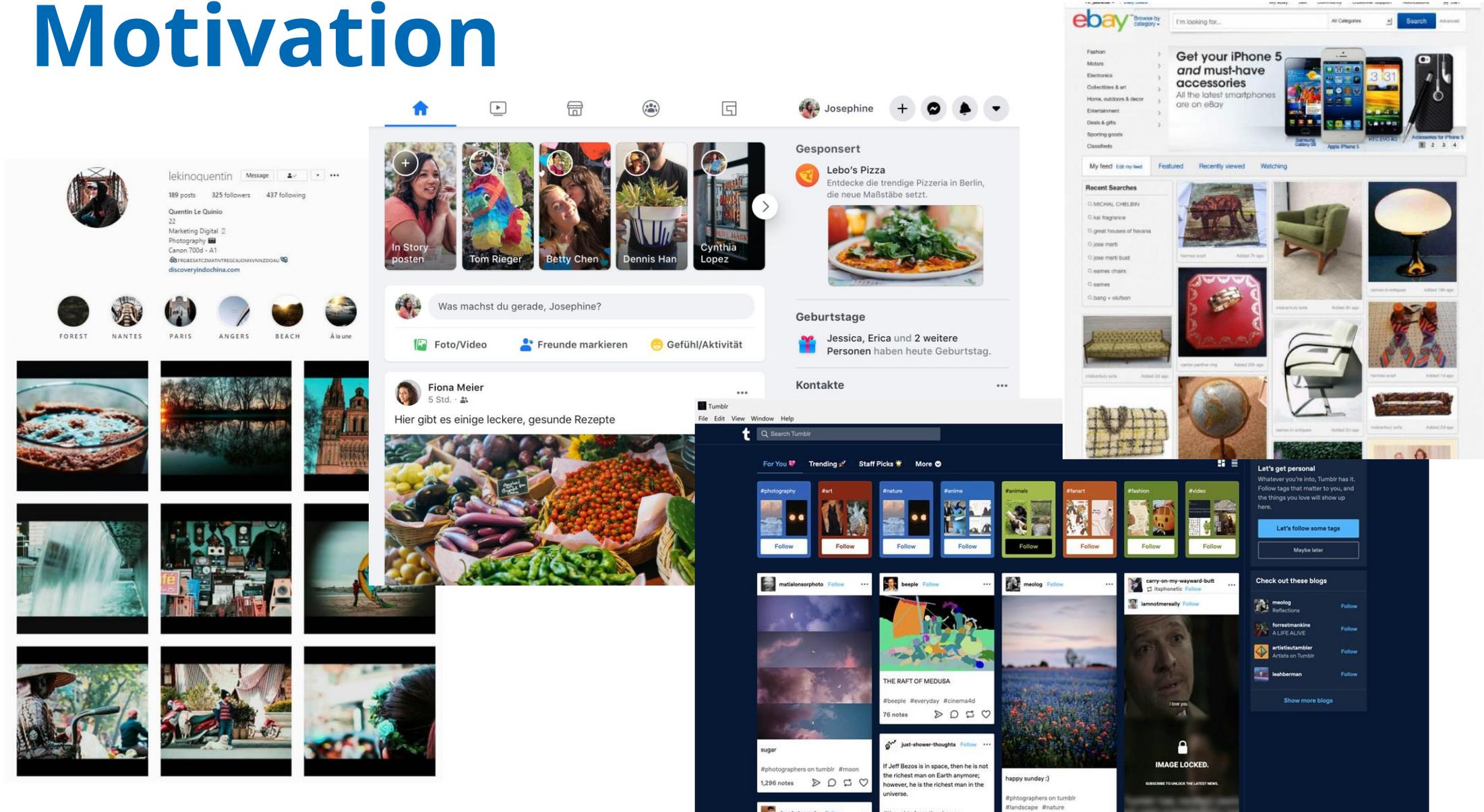
09th March 2026



https://blog.hubspot.de/hs-fs/hubfs/Germany/Blog_images/exif-daten.jpg?width=915&height=609&name=exif-daten.jpg

[hs-mittweida.de](https://www.hs-mittweida.de)

Motivation



Motivation

John McAfee Admits That Vice Accidentally Revealed His Location in Guatemala

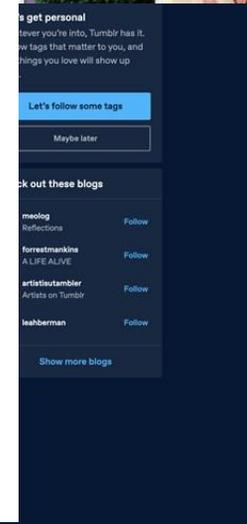
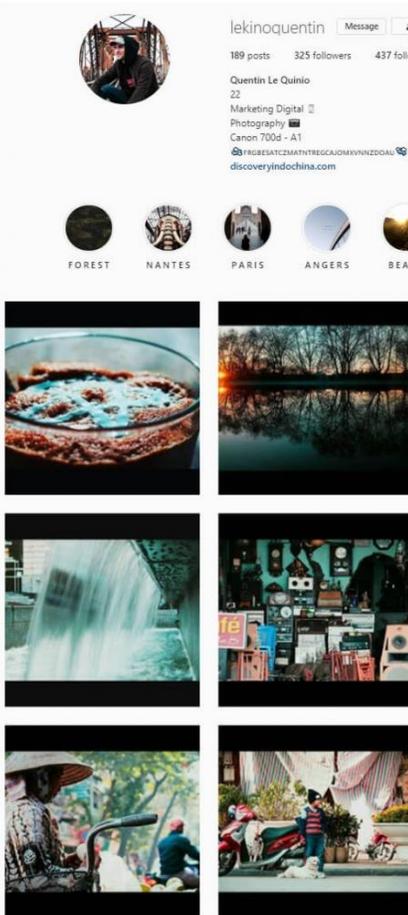
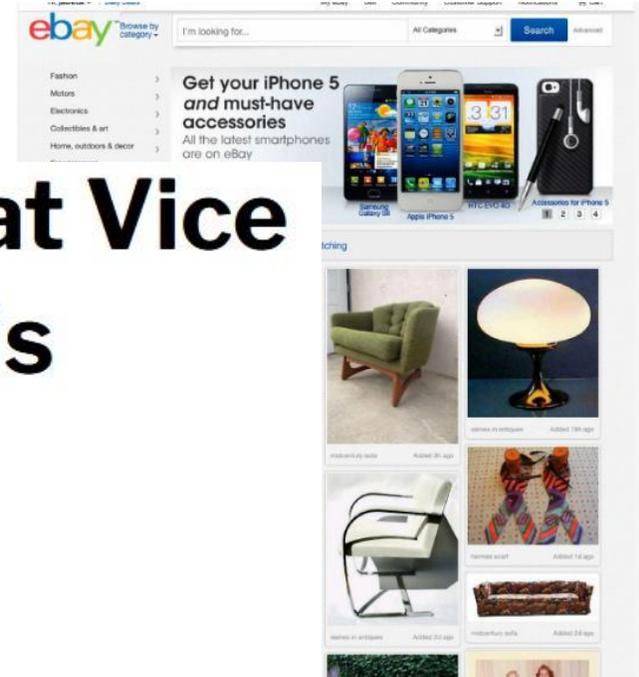
Rookie move, suckers.

By [Jessica Roy](#) • 12/04/12 10:09am



The photo in question. (Photo: Vice)

Antivirus software king [John McAfee](#) finally admitted this morning that an “unseasoned technician at *Vice* headquarters” royally screwed him yesterday by accidentally revealing his top secret location to the entire Internet. Whoops!



What is Metadata?

- Information about other data
- Adding context
- Facilitate search and management of data
- For Images: EXIF, XMP, IPTC

Dateiname:	jpg_image.jpg		
Verzeichnis:			
Voller Pfad:			
Komprimierung:	JPEG, quality: 94, subsampling ON (2x2)		
Auflösung:	149	x	149 DPI <input type="button" value="Ändern"/>
Originalgröße:	1080 x 1650 Pixel (1.78 MPixels) (0.65)		
Aktuelle Größe:	1080 x 1650 Pixel (1.78 MPixels) (0.65)		
Druck-Größe (aus DPI):	18.4 x 28.1 cm; 7.25 x 11.07 inches		
Originalfarben:	16,7 Millionen (24 BitsPerPixel)		
Aktuelle Farben:	16,7 Millionen (24 BitsPerPixel)		
Gezählte Farben:	117567	<input type="checkbox"/>	Zählen aktiv
Benötigter Plattenplatz:	820.58 KB (840.271 Bytes)		
Benötigt. RAM-Speicher:	5.10 MB (5.346.040 Bytes)		
Aktueller Verz.-Index:	1 / 4		
Datum/Uhrzeit:	08.07.2023 / 19:26:52		
Geladen in:	15 Millisekunden		

EXIF - Exchangeable Image File Format

- Created by Japan Electronic and Information Technology Industries Association
- Creation timestamps
- Camera settings
- Goals:
 - Precise search
 - Precise retrieval
 - Precise viewing of images

Image Width	1080
Image Height	1920
Make	Canon
Camera Model Name	Canon EOS 350D DIGITAL
Orientation	Horizontal (normal)
Software	Canon fp Ver.4.00.0.V88
Modify Date	17.04.2023, 18:12:50
Artist	Elisabeth Ziesch
Copyright	Elisabeth Ziesch
Exposure Time	1/45
F Number	72645
Exposure Program	Manual
ISO	100
Shutter Speed Value	1/2000
Aperture Value	4
Metering Mode	Spot
Flash	No Flash
Focal Length	98.9 mm
Color Space	sRGB

XMP - Extensible Metadata Platform

- Created by Adobe
- Uses XML
- Goals:
 - Image processing
 - Copyright information
 - Geographic tagging
 - Creation dates

Sprache	de
Titel	*_image
Autor(en)	Elisabeth Ziesch
Verwendungsrechte	668554
Stichwörter/Betreff	Baum, Blueten, Haus
Aufnahmedatum	17.04.2023
Dateiformat	image/jpg
Erstellungs-Datum	17.04.2023, 18:12:50
Letzte Änderung	17.04.2023, 18:12:50
Letzte Änderung der Metadaten	17.04.2023, 18:12:50
Ort	Mittweida
Land/Hoheitsgebiet	Deutschland
Erstellungs-Datum	17.04.2023

IPTC - International Press Telecommunications Council

- Replaced mostly by XMP
- Target groups:
 - Journalism
 - Museums
- Goals:
 - Keeping cultural heritage
 - Author
 - Content description

CountryCode	DE
CreatorCity	Mittweida
CreatorCountry	Deutschland
CreatorAddress	Technikumplatz
CreatorPostalCode	09648
CreatorRegion	Sachsen
CreatorWorkEmail	e*****@email.com
CreatorWorkTelephone	0*****g
CreatorWorkURL	www.*****.de

Image Formats

- JPEG - Joint Photographic Experts Group
 - Loss-based compression
- PNG - Portable Network Graphics
 - Lossless compression
- TIFF – Tagged Image File Format
 - High quality without information loss
 - Similar to RAW
- WebP
 - Very flexible, better compression as JPEG



135 Selected Platforms

Messenger

Element Signal ICQ Skype
HaloApp WeChat Discord Viber
WhatsApp Webex by Cisco Telegram
Zoom Google Chat Fluffy Chat
Messenger (Google) VK
Messenger (Meta)

Dating

Match EliteSingles Badoo
Bumble LOVOO BlackPlanet
MeetMe Tagged Zoosk
OkCupid Canoodle

Community

Shutterfly Quora AboutMe
Minds CaringBridge Academia Brainly
GoodReads RallyPoint Care2 Snapfish Crockets
NextDoor Opportunity Polywork Quanswer Medium
Influenster girls ask guys Elpha Evernote 23snaps
Patient Like Me ResearchGate Travellerspoint
Diaspora Wattpad Yelp DailyStrength
LiveJournal Stack Overflow Slack

Cloud-Storage

Microsoft OneDrive Dropbox
Google Photos Amazon Photos
Google Drive

Foto-Sharing

500xp VSCO Behance
DeviantArt TinyPic PicsArt
Unsplash Pixaby SmugMug
Foto-Community PostImage ArtStation ImageShack
YouPic Reverly Pexels Dribbble EyeEm
Houzz Imgur
GuruShots Crevado

Sozial Media

GORF Vero Pinterest Snapchat
Whisper hi5 YouTube Wer kennt wen Plurk
Facebook Tumblr Mixi Mastodon FC2 Yareny
MeWe Spinchat X (Twitter) Xing Yooco Amino
Galleria TikTok Befilo Twitch Taringa
Gab LinkedIn Basistar Reddit
Demoxia Facebook Lite ASKfm
Instagram CloutHub

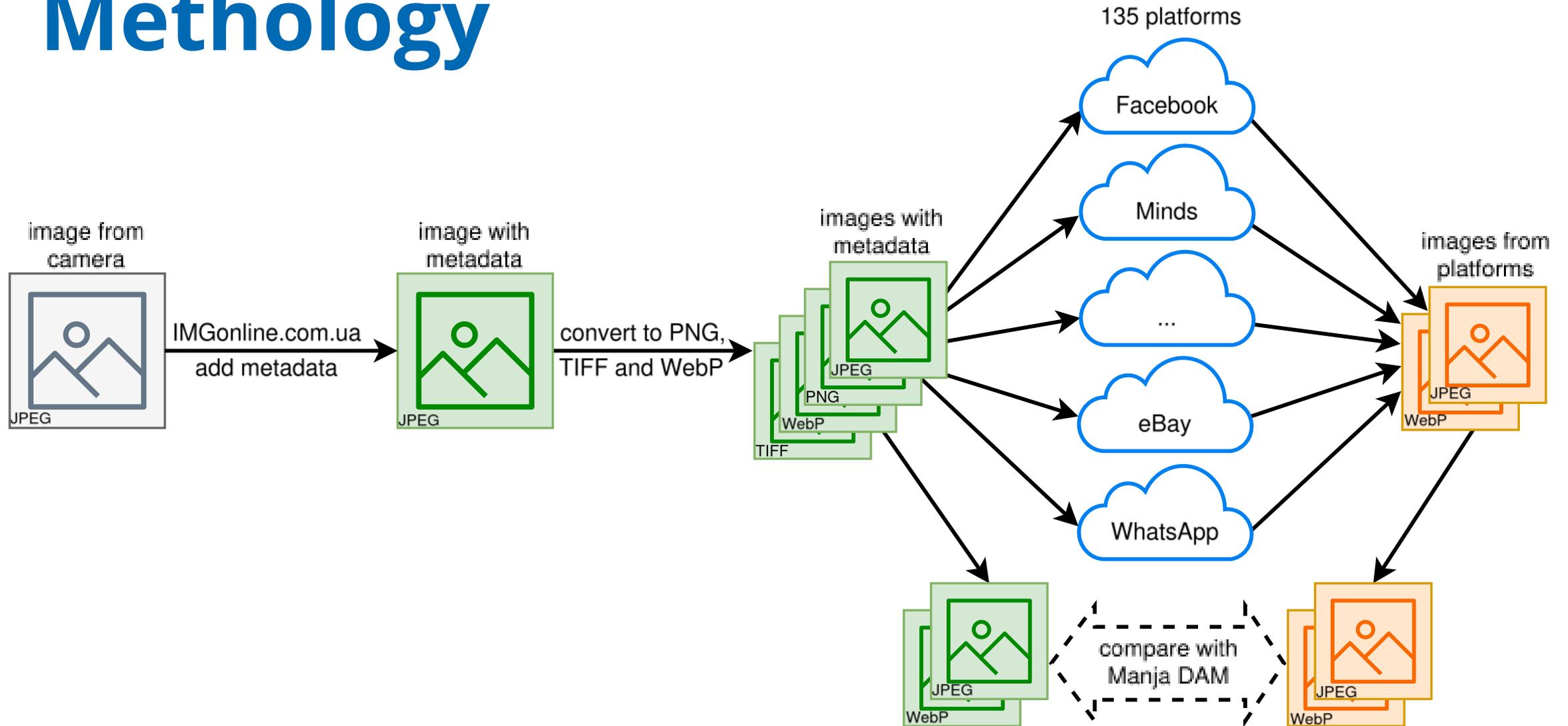
Cooking

Chefkoch Tastemade
Cookpad Yummly

Marketplaces

Vinted Shpock
eBay Facebook Marketplace
Craigslist Kleinanzeigen
Etsy

Methology



Inserting Metadata

- **IMGonline.com.ua**

IMGonline.com.ua
Processing of JPEG photos online.



[Main page](#) | [Resize](#) | [Convert](#) | [Compress](#) | [EXIF editor](#) | [Effects](#) | [Improve](#) | [Different tools](#)

The result of receiving an editable EXIF, IPTC, XMP information (step 2 of 3)

The information that is available for editing received successfully!

Enter or change the desired item in the input field.

To remove any EXIF line from the JPEG image such as camera model, make this field empty. Completely remove all EXIF and all other additional information [you can here](#).

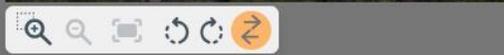
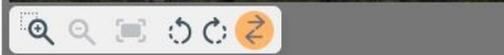
You can use English letters and these symbols: @ _ () / : ; , ' - + = " # \$ % ^ & * ? !

The original image is not changed. You will be given other processed image.

EXIF information that you can change, delete, or add	
Manufacturer <small>Camera firm, for example, Nikon or Canon</small>	<input type="text"/>
Model <small>Camera model, for example, D50 or EOS 400D</small>	<input type="text"/>
Software <small>The name and version of the program, by which the image is created or processed</small>	<input type="text"/>
Other Software	<input type="text"/>
Date and time of last modification <small>In format: YYYY:MM:DD HH:MM:SS, for example, "2015:07:25 18:30:05"</small>	<input type="text"/>

Comparison of Metadaten

- Manja Digital Asset Management

ID: 214 (neueste Version)	Allgemein	ID: 217 (neueste Version)																																																						
	<table border="1"><tr><td>Sprache</td><td>de</td><td>de</td></tr><tr><td>Titel</td><td>jpg_image</td><td>png_image</td></tr><tr><td>Themen</td><td></td><td></td></tr><tr><td>Serie</td><td></td><td></td></tr><tr><td>Beschreibung</td><td></td><td></td></tr><tr><td>Autor</td><td>Elisabeth Ziesch</td><td>Elisabeth Ziesch</td></tr><tr><td>Herausgeber</td><td></td><td></td></tr><tr><td>Mitwirkende</td><td></td><td></td></tr><tr><td>Urheberrechtsvermerk</td><td>668554</td><td>668554</td></tr><tr><td>Aufnahmedatum</td><td>17.04.2023, 18:12:50</td><td>17.04.2023, 18:12:50</td></tr><tr><td>Längengrad</td><td>E13 °43 '56,12"</td><td>E13 °43 '56,12"</td></tr><tr><td>Breitengrad</td><td>N51 °3 '5,61 "</td><td>N51 °3 '5,61 "</td></tr><tr><td>Höhenlage</td><td>113</td><td>113</td></tr><tr><td>Geändert</td><td>17.04.2023, 18:12:50</td><td>17.04.2023, 18:12:50</td></tr><tr><td>Stichwörter</td><td>Baum, Blueten, Haus</td><td>Baum, Blueten, Haus</td></tr><tr><td>Historie</td><td></td><td></td></tr><tr><td>Verknüpfungen</td><td></td><td></td></tr><tr><td>Person(en) im Bild</td><td></td><td></td></tr></table>	Sprache	de	de	Titel	jpg_image	png_image	Themen			Serie			Beschreibung			Autor	Elisabeth Ziesch	Elisabeth Ziesch	Herausgeber			Mitwirkende			Urheberrechtsvermerk	668554	668554	Aufnahmedatum	17.04.2023, 18:12:50	17.04.2023, 18:12:50	Längengrad	E13 °43 '56,12"	E13 °43 '56,12"	Breitengrad	N51 °3 '5,61 "	N51 °3 '5,61 "	Höhenlage	113	113	Geändert	17.04.2023, 18:12:50	17.04.2023, 18:12:50	Stichwörter	Baum, Blueten, Haus	Baum, Blueten, Haus	Historie			Verknüpfungen			Person(en) im Bild			
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Complete removal of Metadata

Messenger

Signal
HalloApp Line
WhatsApp Telegram
Messenger (Google) VK

Dating

Match EliteSingles Badoo
Bumble LOVOO BlackPlanet
MeetMe Tagged Zoosk
OkCupid Canoodle

Community

Quora AboutMe
Minds
Care2 Crockets
RallyPoint Quanswer
NextDoor Opportunity Polywork 23snaps
Inflenster Travellerspoint
DailyStrength
Diaspora Wattpad Yelp
Stack Overflow

Foto-Sharing

Unsplash Pixaby
Foto-Community
ArtStation
YouPic Pexels Houzz Imgur
GuruShots Crevado

Sozial Media

GORF Snapchat
Whisper Vero Plurk
hi5 YouTube Yareny
Mixi Mastodon
Spinchat X (Twitter) Xing
TikTok Befilo Twitch
Gab LinkedIn Basistar Reddit
Demoxia Facebook Lite ASKfm
Instagram CloutHub

Cloud-Storage

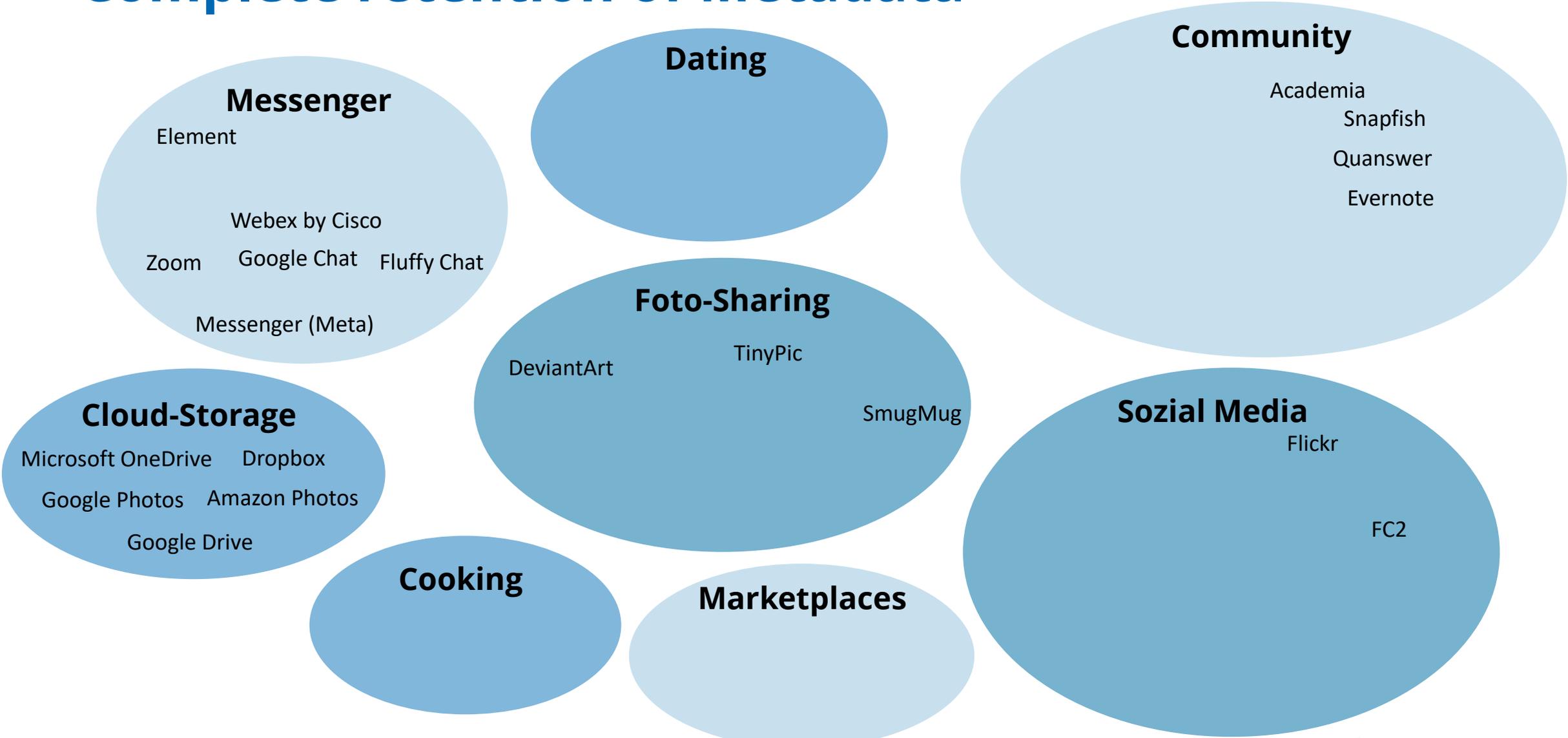
Cooking

Chefkoch Tastemade
Cookpad Yummly

Marketplaces

Vinted Shpock
eBay
Craigslist Kleinanzeigen
Etsy

Complete retention of Metadata



Partial preservation of metadata

Messenger

WeChat
Discord
Viber
ICQ
Skype

Dating

Community

Shutterfly
GoodReads
CaringBridge
Brainly
Medium
girls ask guys
Elpha
Patient Like Me
ResearchGate
DailyStrength
Slack
LiveJournal

Foto-Sharing

500xp
VSCO
Behance
PicsArt
PostImage
ImageShack
Reverly
Dribble
EyeEm

Cloud-Storage

Sozial Media

Pinterest
Facebook
MeWe
Galleria
Tumblr
Wer kennt wen
Yooco
Amino
Taringa

Cooking

Marketplaces

Facebook Marketplace

Dates and times

Messenger

Skype
ICQ
Discord
Viber

Dating

Community

Shutterfly
CaringBridge
GoodReads
girls ask guys
Elpha
Patient Like Me
ResearchGate
LiveJournal

Foto-Sharing

Behance
PostImage
ImageShack
Reverly
EyeEm

Sozial Media

Pinterest
Wer kennt wen
MeWe
Galleria
Yooco
Taringa

Cloud-Storage

Cooking

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Copyright

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Shutterfly
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girls ask guys
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Foto-Sharing

Behance
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Dribble
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Cloud-Storage

Sozial Media

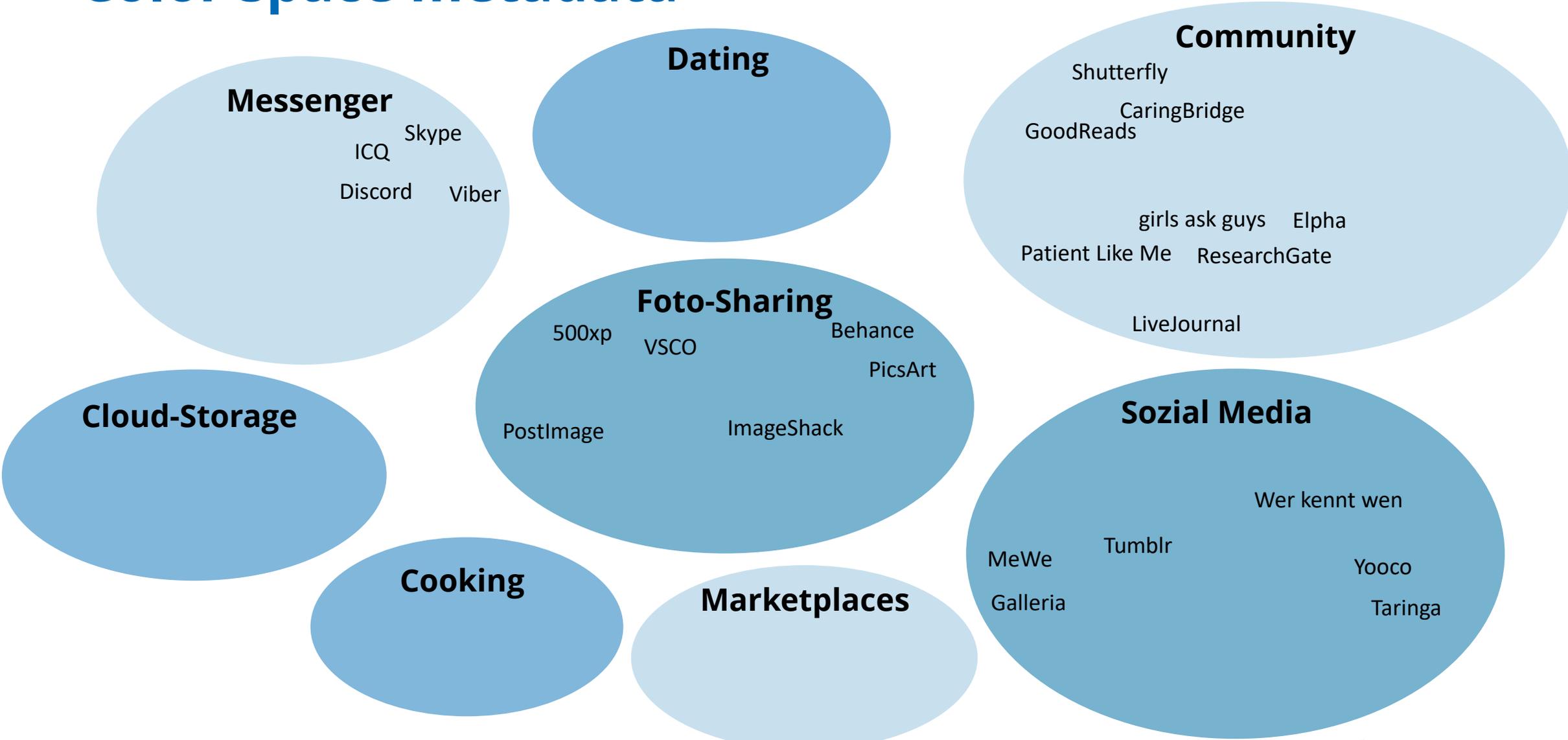
Pinterest
Wer kennt wen
Facebook
MeWe
Tumblr
Yoooco
Galleria
Taringa

Cooking

Marketplaces

Facebook Marketplace

Color space metadata



Location information

Messenger

Skype
ICQ
Discord

Dating

Community

girls ask guys Elpha
Patient Like Me ResearchGate

LiveJournal

Foto-Sharing

Behance

PostImage

Cloud-Storage

Sozial Media

Wer kennt wen

MeWe

Yooco

Galleria

Taringa

Cooking

Marketplaces

Camera model

Messenger

Skype
ICQ
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ResearchGate
LiveJournal

Foto-Sharing

PostImage
ImageShack
Reverly

Sozial Media

MeWe
Galleria
Yooco
Taringa

Cloud-Storage

Cooking

Marketplaces

No conversion of format

Messenger

Element
Skype
ICQ
Discord
Webex by Cisco
Zoom
Google Chat
Fluffy Chat

Dating

MeetMe

Community

Academia
Snapfish
Crocketts
RallyPoint
Evernote
Elpha
Travellerspoint
Patient Like Me
Diaspora
LiveJournal
Stack Overflow
Slack

Cloud-Storage

Microsoft OneDrive
Dropbox
Google Photos
Amazon Photos
Google Drive

Foto-Sharing

500xp
DeviantArt
VSCO
TinyPic
Unsplash
Pixaby
SmugMug
Reverly

Sozial Media

Flickr
hi5
MeWe
Mastodon
Xing
Yooco
Basistar
ASKfm

Cooking

Marketplaces

Deduce the platform by fingerprint?

- Only for partial platforms (25%)
- Only if **all** metadata fields have been filled before upload
- Findings can be used as negative mask.
 - „This image can not be downloaded from XYZ.“



Conclusion

- 60% remove metadata completely
- All platforms with sensitive data remove metadata (Dating)
- Cloud storage does not modify data
- No unified handling of image formats
- No modification of metadata
- TIFF is rarely accepted
- We provided an upper limit of expected forensic metadata.

Possible deviations

- Experiment performed in Germany (strict privacy laws)
- Browser Microsoft Edge
- Virtual Android for Apps
- Download minutes after Upload
 - Old images = different outcome?
- Just direct chats, no group chats

Future Work

- More platforms and media formats
- Metadata in documents (PDF, ...)
- Different app sections (group chats, stories, status)
- Is metadata still present on the server? (removed during download)
- Changes in image content (watermark, compression, ...)
- App vs web application
- Smartphone vs computer

Gracias!

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**HOCHSCHULE
MITTWEIDA**
University of Applied Sciences



Kofinanziert von der
Europäischen Union



Diese Maßnahme wird mitfinanziert durch
Steuermittel auf der Grundlage des vom
Sächsischen Landtag beschlossenen Haushaltes.