https://www.flickr.com/photos/tprzechlewski/2884966649/

Augmenting photos with metadata (using exiftool)

Tomasz Przechlewski

Metadata

Information about information!

Microsoft Office enables augmenting documents with metadata.

Metadata can be saved in HTML documents in meta/title tags

```
<meta name="Keywords"
  content="biblioteka, biblioteka cyfrowa,prawa autorskie,biblioteka 2.0,dlibra">
<meta name="Description"
  content="Wprowadzenie do tematu bibliote cyfrowych.">
<title>Biblioteka 2.0 / Semantyczna biblioteka</title>
...
```

Simple metadata has limited usefulness because:

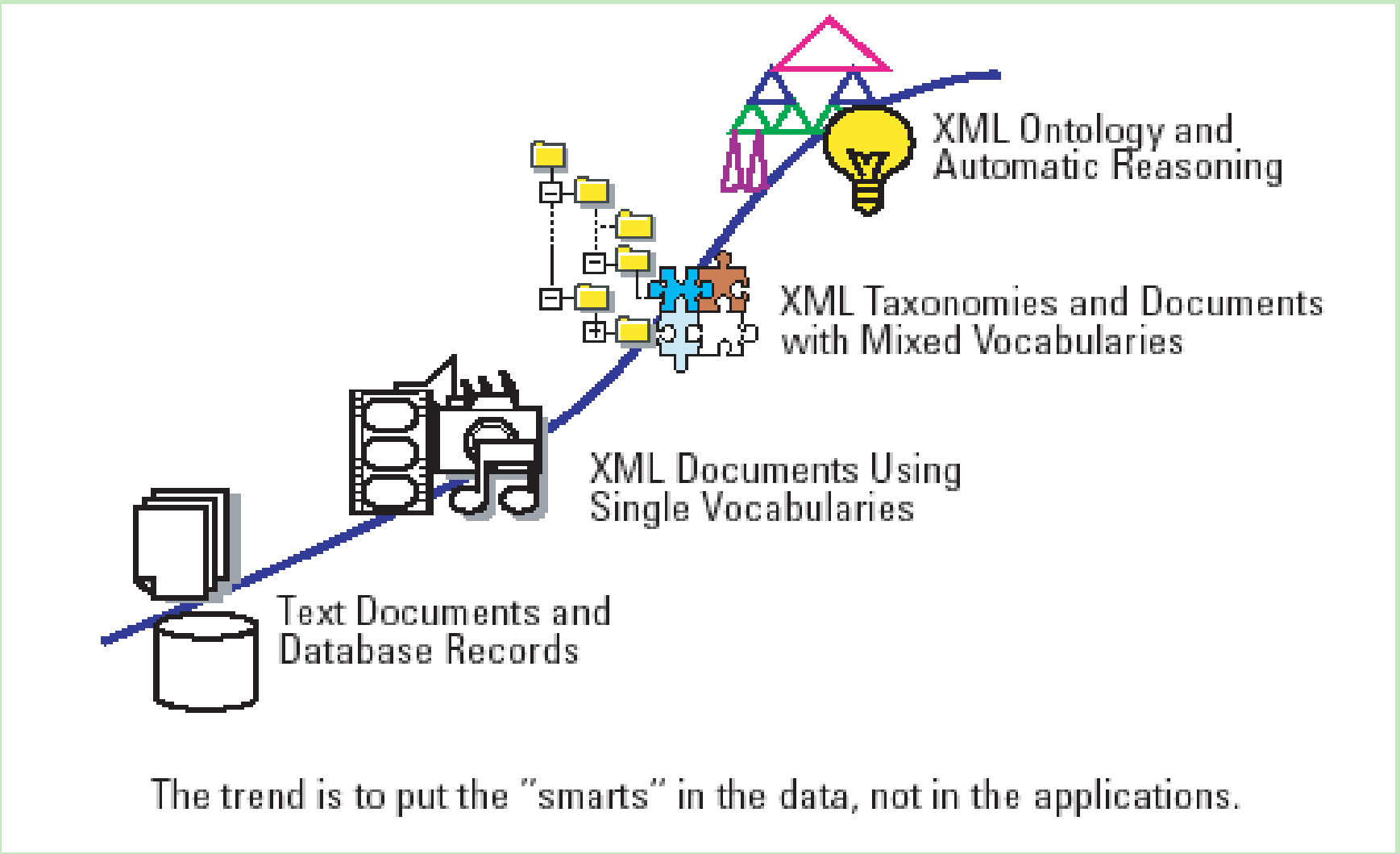
One can describe only documents (not abstract objects), which are accessible (one has modification premission)

Metadata = bag of words (ambiguity)

Metadata requirements: Open (standards); Extensible (Support custom schemas); Universal (Support diverse data/formats); Robust (Keep metadata and asset in sync!)

The Smart Data

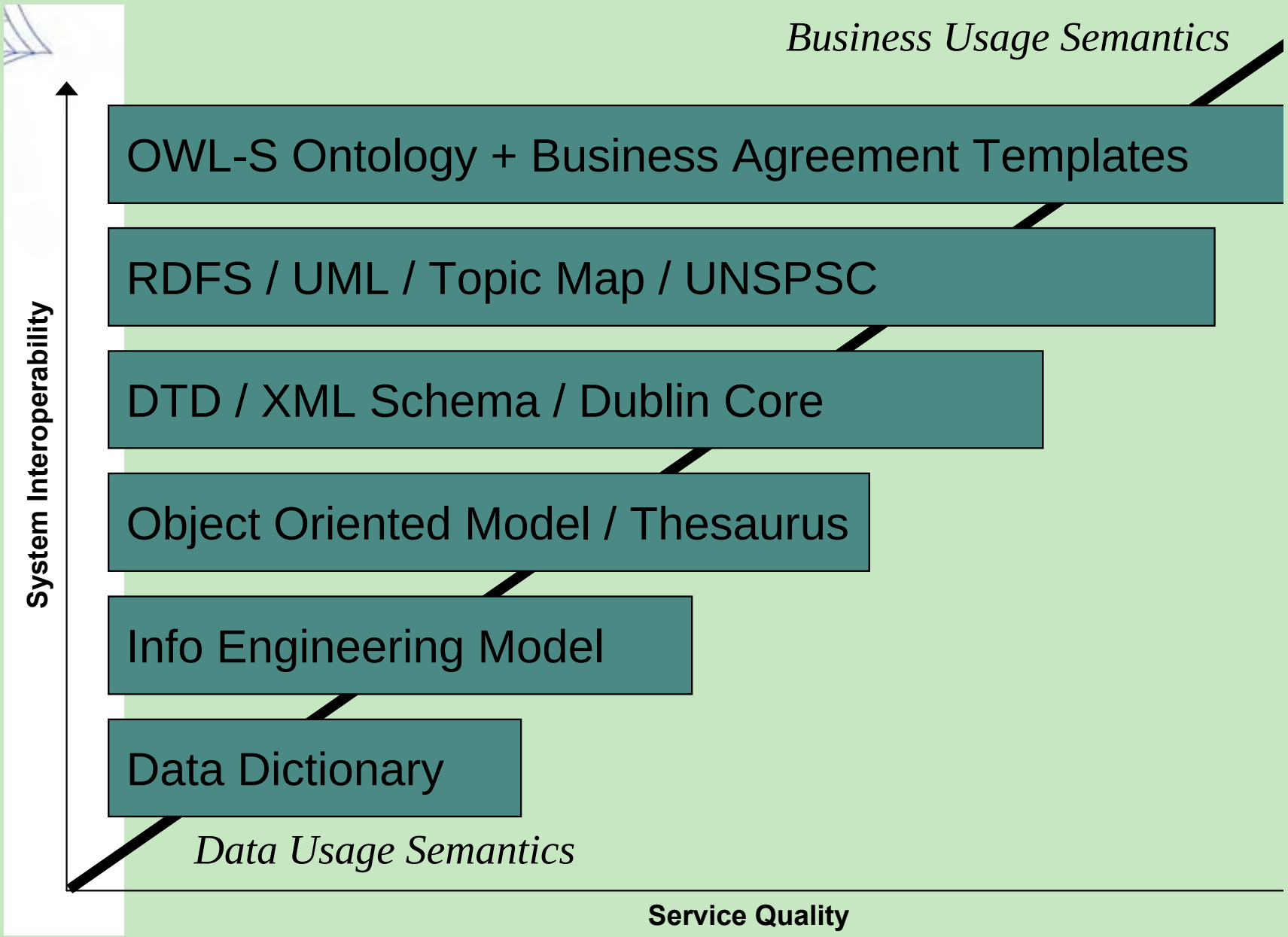
The Smart Data Continuum and the Road to Information Independence



Source: *The Semantic Web: A Guide to the Future of XML, Web Services, and Knowledge Management*, Wiley Technology Publishing, June 2003 (Ed Chase, *PDF and Metadata*, Adobe Systems, Inc. 2004.)

Layers of Wisdom

The Semantic Spectrum: Layers of Wisdom



Source: Ed Chase, *PDF and Metadata*, Adobe Systems, Inc. 2004.

Resource Description Framework (RDF)

It is possible to describe not only documents (but abstract objects as well)

Extensible

Serialized (written/saved) as XML

Resources

A resource is an object described which does not have to be a document, it can be any object (physically existing or abstract)

Resources can be identified by a URI (or a string)

Universal Resource Identifier (URI):

`http://purl.org/dc/elements/1.1/creator`

Namespace

`http://purl.org/dc/elements/1.1/`

Local name

`creator`

Name space identifier

`dc`

Shorthand

`dc:creator`

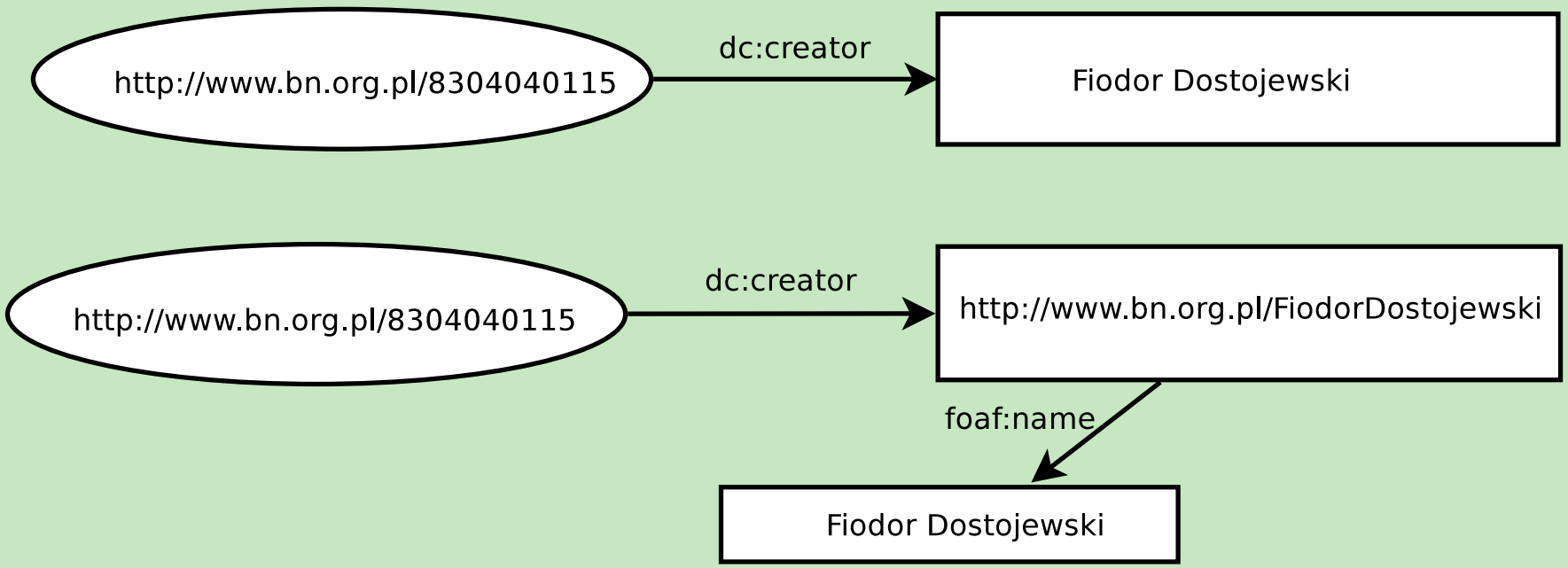
Resource Description Framework cont.

The metadata is expressed as simple expressions (sentences):

Subject + *Property* + *Object*

Subject / Property = resource (ie something identified by the URI)

Object = resource or string



RDF does not have any semantics. Common schemas (Dublin Core, FOAF) are needed.

RDF schema: namespace + set of resources (including properties) + resource interpretation

Common schemas

Dublin Core Metadata Initative

Namespace URI http://purl.org/dc/elements/1.1/

Elements (15): Title, Creator, Description etc...

Exif

Used by manufacturers of digital cameras. Exif metadata includes: image description (resolution, size, time of exposure) camera details (manufacturer/model, software version); camera settings (aperture, time, mode, focal length, etc.); bibliographical description (copyright, description of an image, author/creator); geolocation data

```
exiftool -all FILE.jpg
```

XMP (ISO 16684-1:2012)

Standard based on RDF. XMP can include DC/Exif and several other schemes of metadata. Extensible with custom schemes (with all consequences :-).

> XMP was designed to be easily extensible by the addition of custom namespaces. If your metadata needs are not already covered by the core namespaces, you can define and use your own namespaces

Metadata models

Controlled vocabulary: No relationships between concepts (objects), Uncontrolled vocabulary: folksonomy, tags

Taxonomy: a controlled vocabulary with hyponomy/hyperonimy relationships (broader/narrower) parent-child

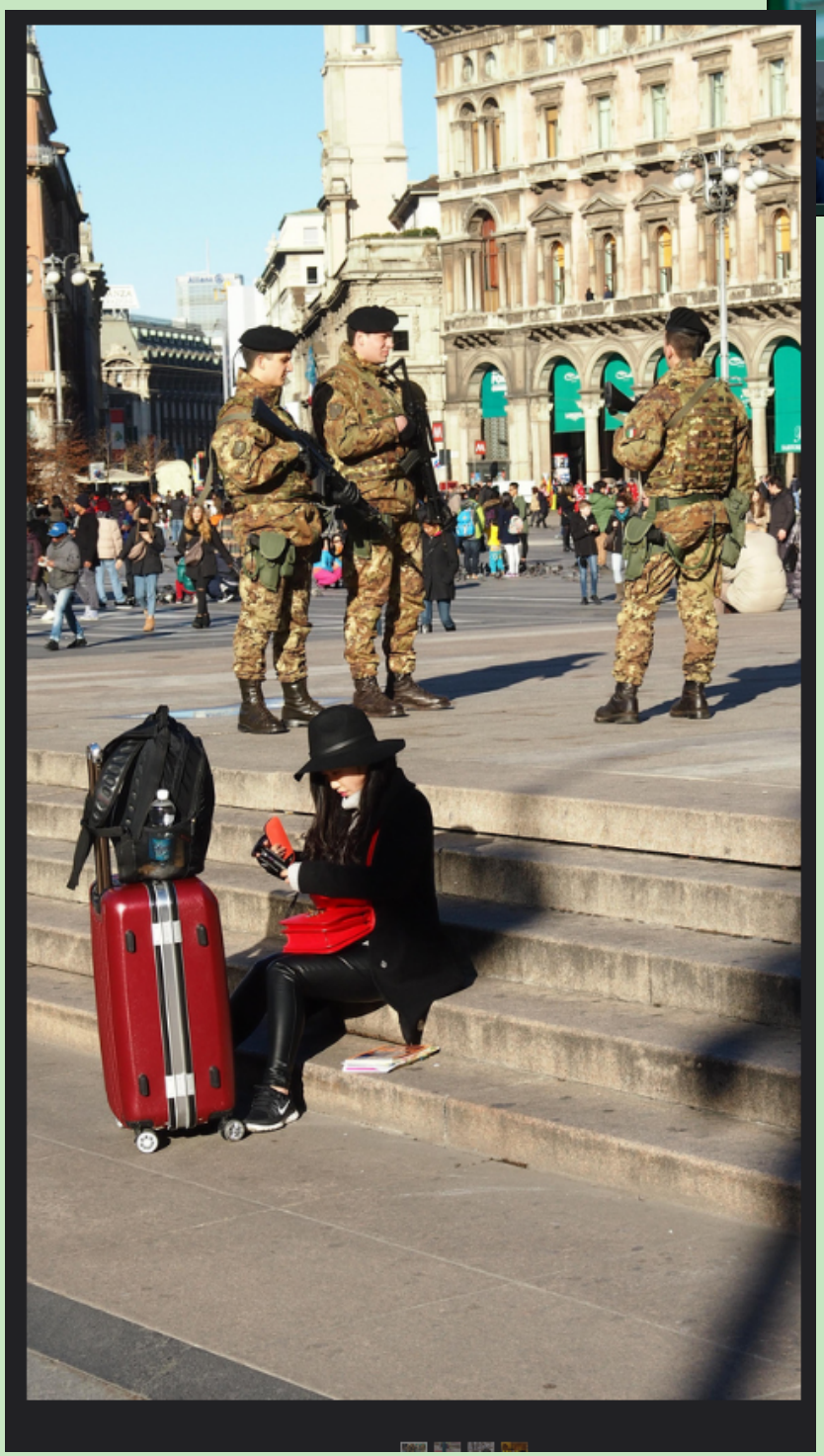
Thesaurus – is a taxonomy that also has some 'other' relationships, such as associations

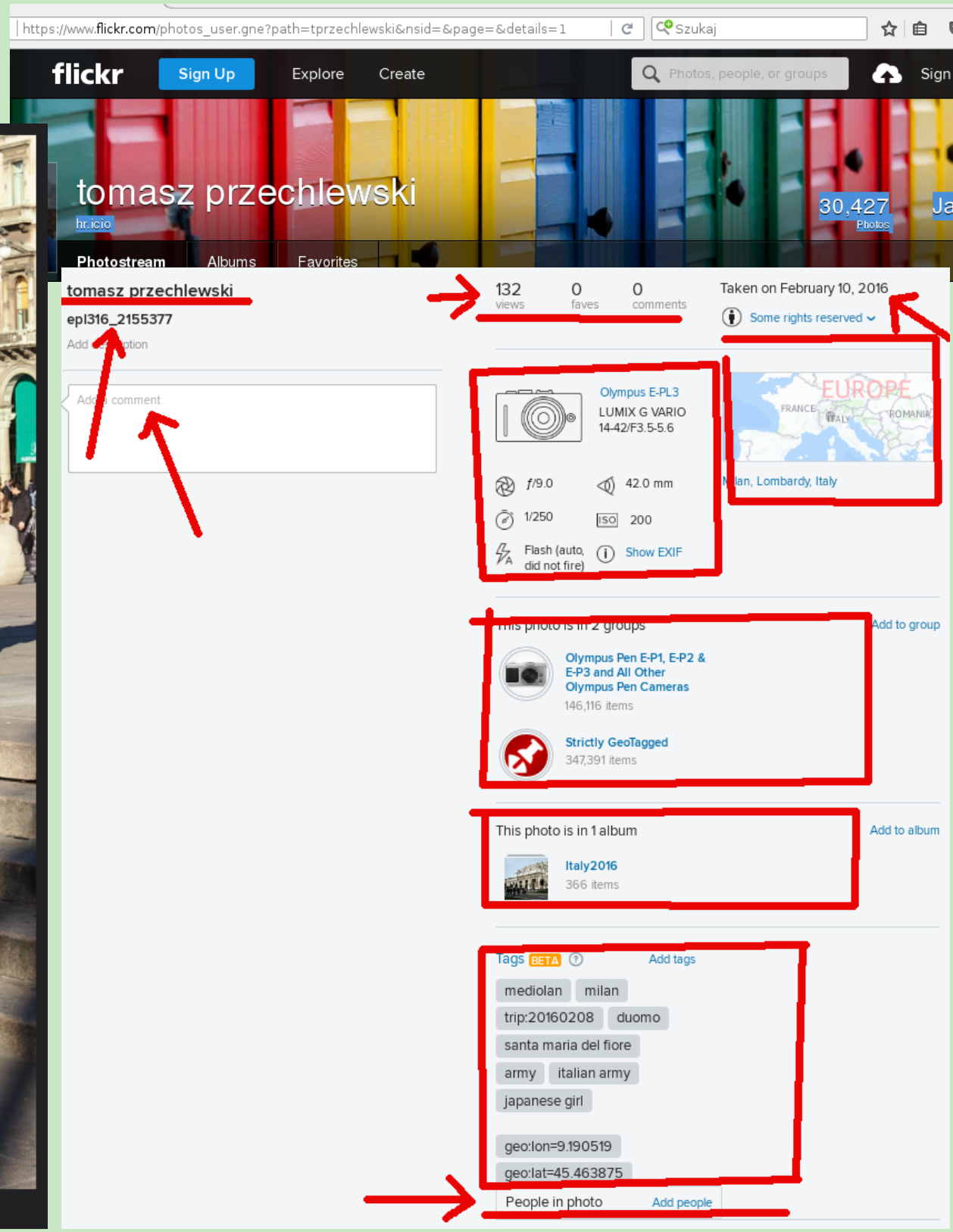
The associative relationship is a relationship between two concepts which do not belong to the same hierarchical structure, although they have semantic or contextual similarities RT = related term

Other useful relations: equivalent/synonim (auto=car); foreign languages equvalents

Ontology (informal definition) An ontology is a model of (a relevant part of) the world, listing the types of object, the relationships that connect them, and constraints on the ways that objects and relationships can be combined.

Flickr




https://www.flickr.com/photos_user.gne?path=tprzechlewski&nsid=&page=&details=1
Szukaj
flickr
Sign Up
Explore
Create
Photos, people, or groups
Sign In
tomasz przechlewski
hr.icio
30,427
Photos
January 2006
Member Since
Photostream
Albums
Favorites
tomasz przechlewski
epl316_2155377
Add a description
Add a comment
132
views
0
faves
0
comments
Taken on February 10, 2016
Some rights reserved
Olympus E-PL3
LUMIX G VARIO
14-42/F3.5-5.6
ƒ/9.0
42.0 mm
1/250
ISO 200
Flash (auto, did not fire)
Show EXIF
EUROPE
FRANCE
ITALY
ROMANIA
Milan, Lombardy, Italy
This photo is in 2 groups
Add to group
Olympus Pen E-P1, E-P2 & E-P3 and All Other Olympus Pen Cameras
146,116 items
Strictly GeoTagged
347,391 items
This photo is in 1 album
Add to album
Italy2016
366 items
Tags BETA
Add tags
mediolan
milan
trip:20160208
duomo
santa maria del fiore
army
italian army
japanese girl
geo:lon=9.190519
geo:lat=45.463875
People in photo
Add people

Descriptions / The purpose

To facilitate further search for a photo
Example: I remember that some time ago a rugby tournament took place in Poland. The exact year is not remembered. I know it was a U-18 or U-19 junior championship. I'm looking for a photo of a Georgian rugby player whose name I can not remember of course. Adding the appropriate tags to the image – the more the better – will help to find what one is looking for:

`sopot rugby gruzja u18`
or
`sopot rugby gruzja u19`

EXIF: UserComment (EXIF lacks something more adequate), comma separated tags

To explicity describe authorship and legal status (license)
My photos are available under CC license. By adding relevant information the photo is not anonymous and the license for its dissemination is explicit:

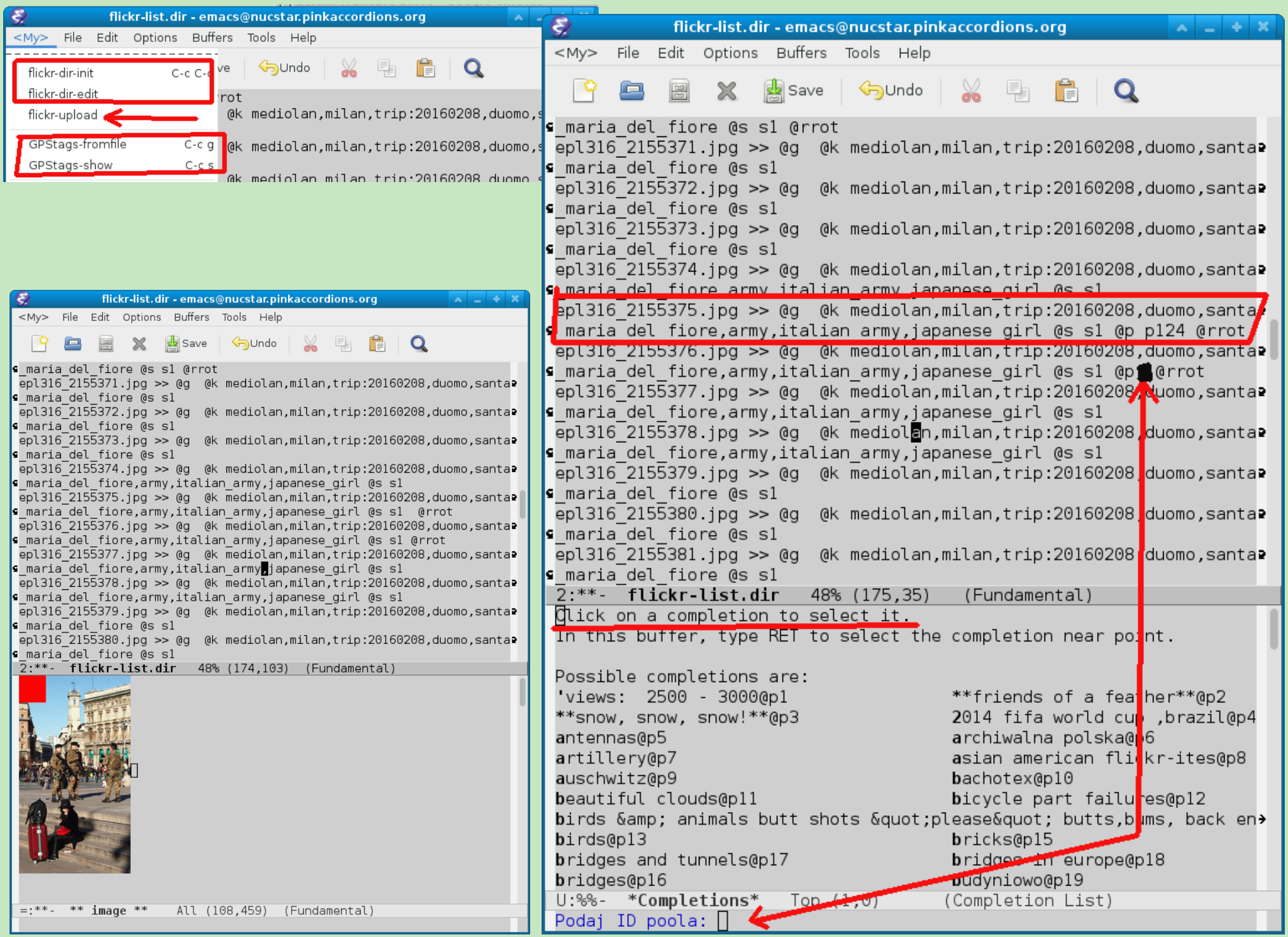
EXIF: `Artist` and `Author` (creator credentials), `Copyright` (for example CC license)

To make impression on family and friends
Geotagged photos can be shown on maps

EXIF: `GPSLongitudeRef`, `GPSLongitude`, `GPSLatitudeRef`, `GPSLatitude` and `GPSAreaInformation`

Why Emacs

Descriptions have to be added quickly (because there are a lot of photos).
Filling a form / dialog box (standard in GUI applications) is too time consuming.
Solution: an advanced programming editor (Emacs) providing: copy, paste, keyboard shortcuts, blocks, etc...



What is added

Exiftool allows to view and/or modify metadata stored in JPG files

```
## list all taga (-a) as RDF (-X)
exiftool -a -X IMG20170304094013.jpg
## list all exif tags
exiftool -EXIF:* IMG20170304094013.jpg
```

```
xmlns:IFD0='http://ns.exiftool.ca/EXIF/IFD0/1.0/
xmlns:ExifIFD='http://ns.exiftool.ca/EXIF/ExifIFD/1.0/
xmlns:XMP-pdf='http://ns.exiftool.ca/XMP/XMP-pdf/1.0/
xmlns:GPS='http://ns.exiftool.ca/EXIF/GPS/1.0/

<IFD0:Artist>Creator: Tomasz Przechlewski</IFD0:Artist>
<XMP-pdf:Author>Creator: Tomasz Przechlewski</XMP-pdf:Author>
<IFD0:Copyright>Licence: CC Attribution</IFD0:Copyright>
<ExifIFD:UserComment>test, selfportrait, cycling [http://www.flickr.com/photos/tp
<ExifIFD:ImageUniqueID>http://www.flickr.com/photos/tprzechlewski/3324849615/</E
<GPS:*> ... </GPS:*>
```

```
# Add new tag values (-TagName='Value')
exiftool -ImageUniqueID='flickrURL' -UserComment='flickrTags' -Artist='tp'
-Author='tp' -Copyright='Licence: CC Attribution'
-ImageDescription='Opis (if any)'
```

What is added cont. (geolocations)

```
exiftool -GPSLongitudeRef=E -GPSLongitude=18.559 -GPSLatitudeRef=N
-GPSLatitude=54.439 -GPSAreaInformation='Sopot#Molo-poczatek'
```

Exiftool – examples

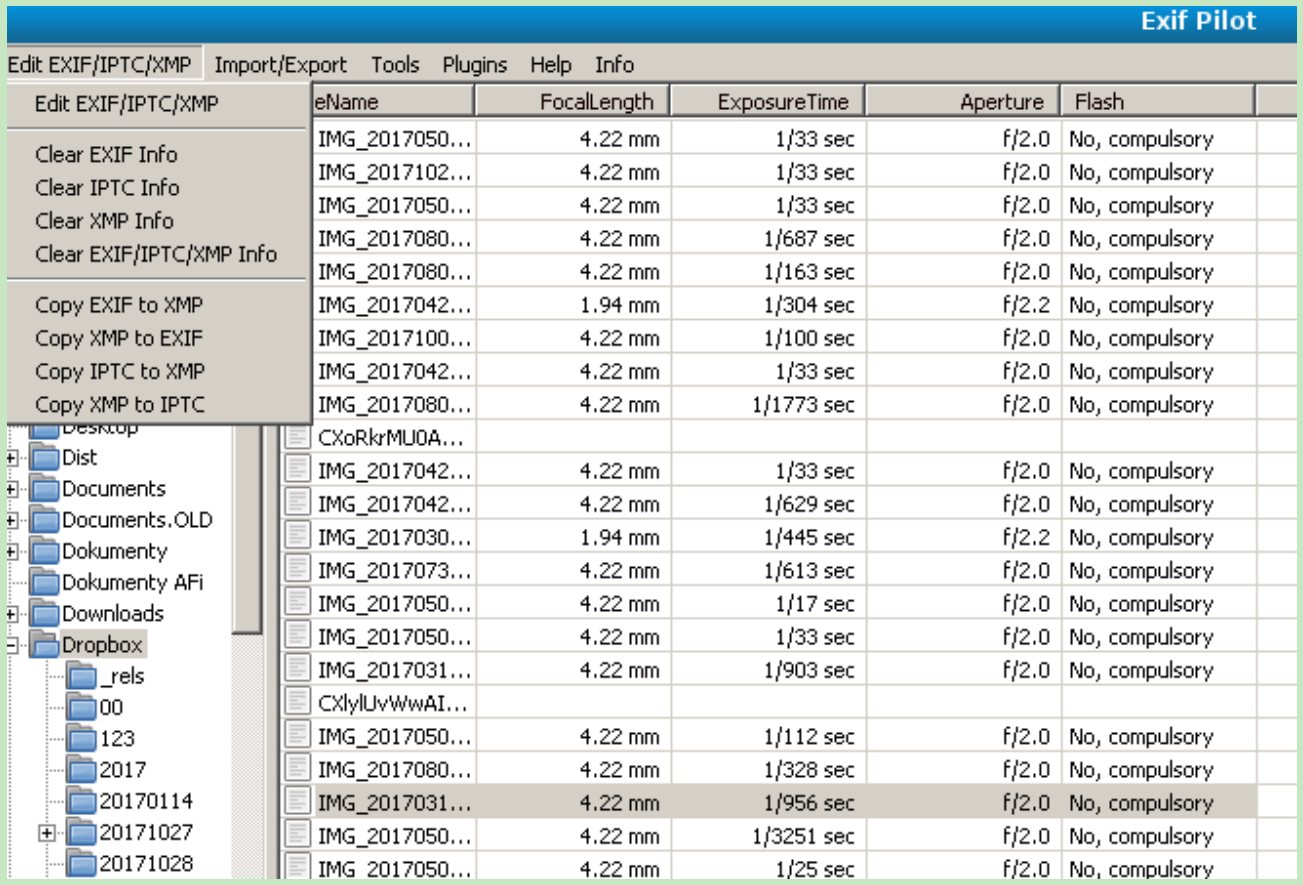
```
#Writes Artist tag to a|b|c.jpg (or directory ./images). Since no group is specified,
#EXIF:Artist will be written and all other existing Artist tags
exiftool -artist="Phil Harvey" -copyright="2011 Phil Harvey" a.jpg b.jpg c.jpg
exiftool -artist="Phil Harvey" -copyright="2011 Phil Harvey" ./images


# Writes ImageUniqueID|UserComment|Artist|Author|Copyright|ImageDescription to file
#exiftool  -ImageUniqueID='flickrURL' -UserComment='tags' -Artist='tp'
#  -Author='tp' -Copyright -ImageDescription='Opis' file.jpg
#
# Writes geocoordinates to file
#exiftool -GPSLongitudeRef=E -GPSLongitude=139.7513889
#   -GPSLatitudeRef=N -GPSLatitude=35.685 -GPSAreaInformation='Sopot' file.jpg

# Extract Camera Model
exiftool -Model IMG_20170304_161946.jpg
Camera Model Name  : Redmi 3S

#Extract all author-related XMP information from an image.
exiftool -xmp:author:all -a image.jpg
```

Exiftool – examples cont.

```
#Copy all tags from  src.jpg to dst.jpg
exiftool -tagsfromfile src.jpg dst.jpg

# Erase all meta information from dst.jpg image, then copy EXIF tags from src.jpg.
exiftool -all= -tagsfromfile src.jpg -exif:all dst.jpg

# Add (+=) 32 seconds to all times
# in all files from ./Images directory
exiftool -alldates+=00:00:32 ./Images

# Remove all gps-related tags
exiftool -gps:all= *.jpg
```

GUI applications

Add/modify metadata with Exif pilot.



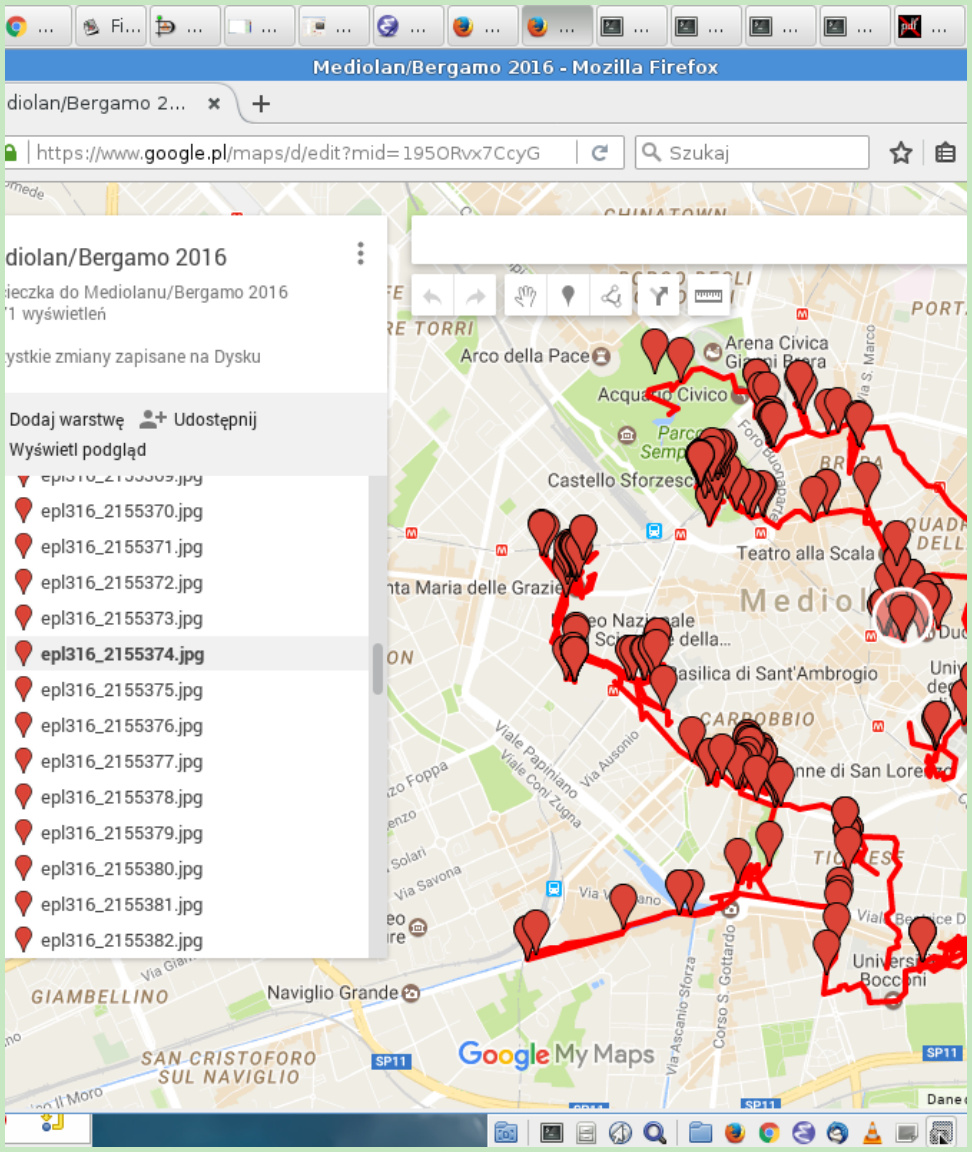
Google mymaps

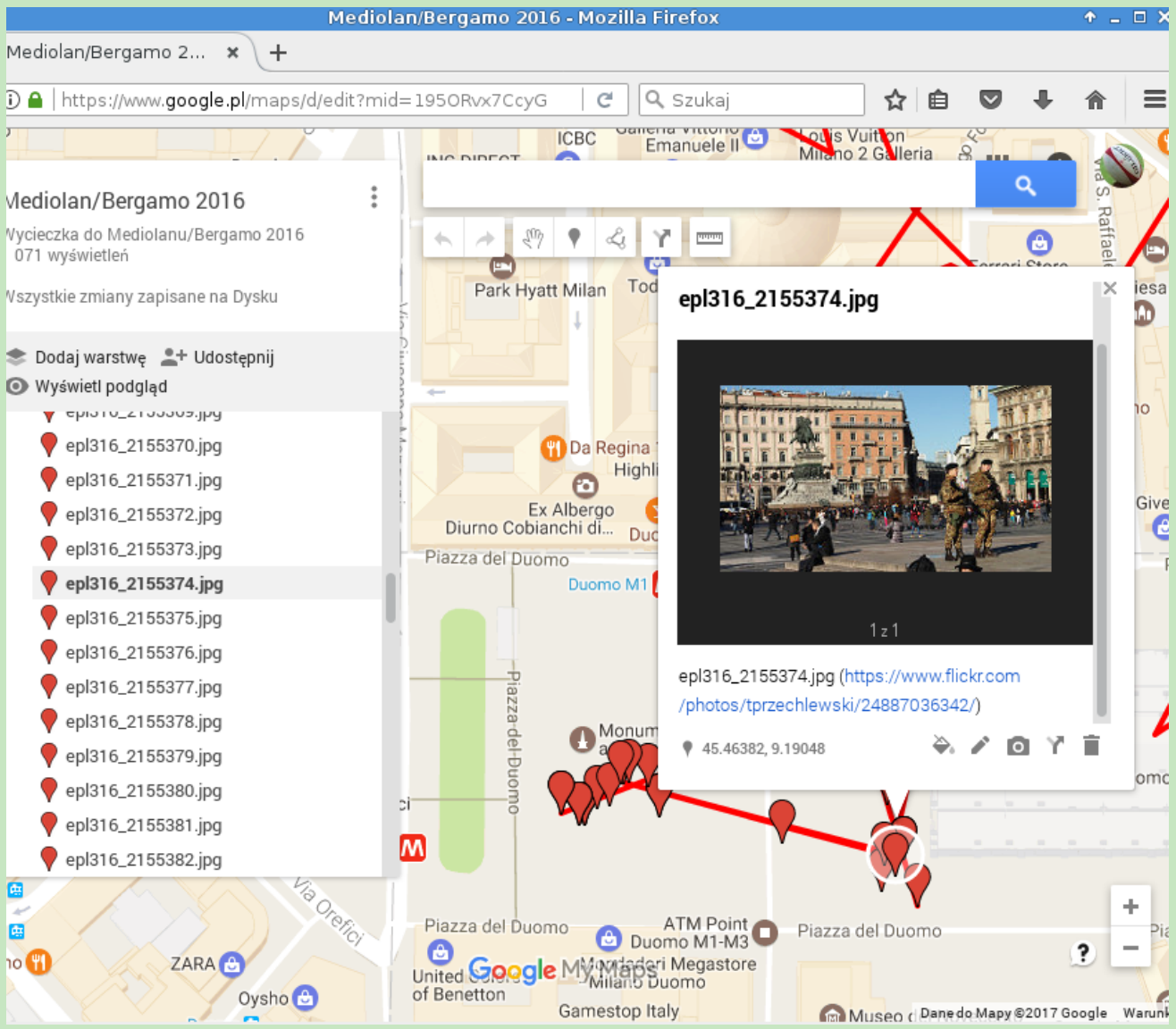
The KML file created by `mk_kml.pl` can be displayed on GoogleMaps or similar.

Photos are stored at `flickr.com`.

Can be stored/downloaded from any server, our own is the best of course, as using some third-party (free) facility one can experience so-called **disappearing cloud (provider) problem**.

`https://www.google.pl/maps/d/`

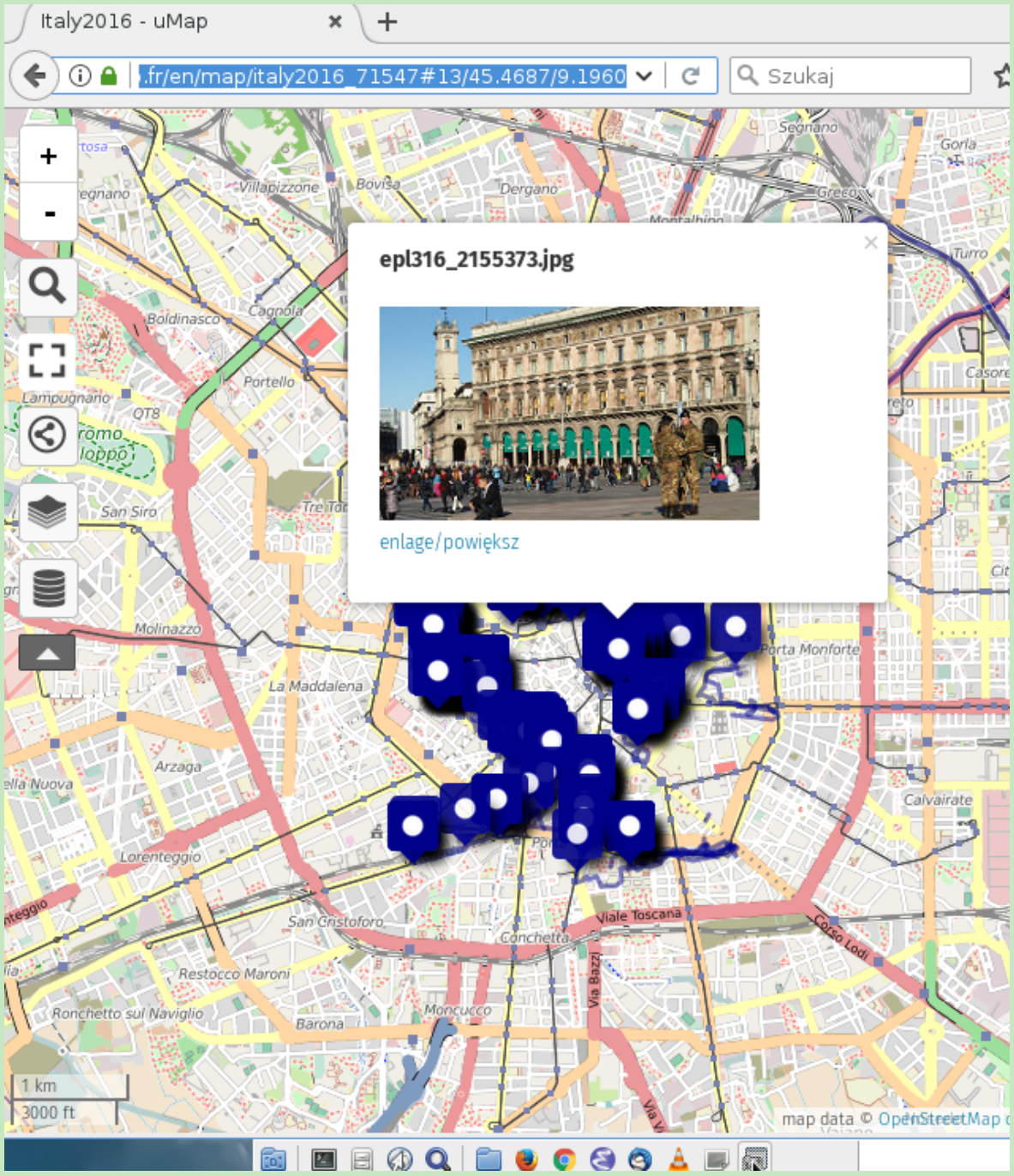




umap.fr

Displaying KML at `umap.fr` (instead of GoogleMaps)

```
https://umap.openstreetmap.fr/en/map/italy2016_71547#13/45.4687/9.1960
```



KML (google maps)

```
<Placemark><name>IMG_20170304_094013.jpg</name>
 <description><![CDATA[<a href='http://www.flickr.com/tprzechlewski/33248495615'>
  <img src='https://farm4.staticflickr.com/3852/33248495615_1537851166_m.jpg'
    width='200' /></a><br><a href='http://www.flickr.com/tprzechlewski/33248495615'>#fullSize
  </description>
 <ExtendedData>
   <Data name='gx_media_links'>
     <value>https://farm4.staticflickr.com/3852/33248495615_1537851166_m.jpg</value>
   </Data>
 </ExtendedData>
 <Point>
  <coordinates>18.05169167,54.71651111</coordinates>
 </Point>
</Placemark>
```

Markdown (umap.fr)

```
<description>
{{https://farm4.staticflickr.com/3852/33248495615_1537851166_m.jpg}}
[[http://www.flickr.com/tprzechlewski/33248495615|enlarge/powieksz]]
</description>
```

https://www.flickr.com/photos/tprzechlewski/91096674/

Endnote: My flickr account is active from 2006.
Proof included: Sopot pier in february/2005,
uploaded to flickr in january/2006

The END | Thanks