

Re-use under licence - what use is quality if your product is illegal?

Anthony Beck

Abstract

Geospatial web services provide general and niche products some of which are based on multiple data sources each data source used under licence. End-users may further chain these services to produce a myriad of other derived data products and services. The background licencing issues can become very complex. Incompatibilities between different licences means that some data products should not be integrated. Hence, licence heterogeneity is a barrier to data integration and interoperability in the way that semantic, syntactic and schematic heterogeneities are also barriers. This presentation will provide an overview of these issues, to describe a potential semantic licence framework, and through discussion better understand where the OGC might be able to help with licence, or legal, interoperability.

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This document has been written in [CommonMark](#): an unambiguous implementation of Markdown for scholarly writing.

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Re-use under licence:

what use is quality if your product is illegal?



Date: 20150916

Venue: OGC Conference

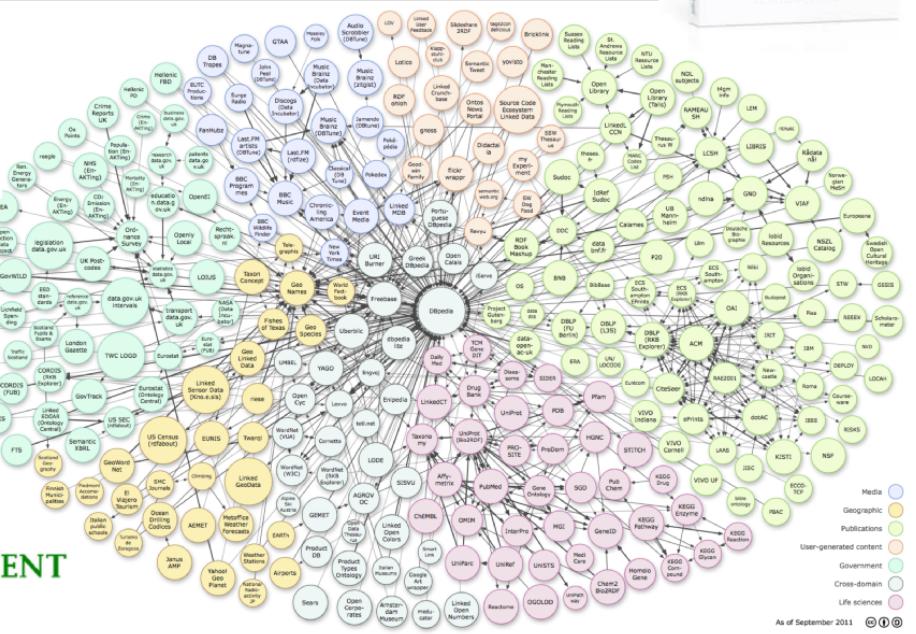


Figure 1:

Go down for licence and other metadata about this presentation

1 Preamble

1.1 Licence

Unless stated otherwise all content is released under a [CC0]+BY licence. I'd appreciate it if you reference this but it is not necessary.



Figure 2:

1.2 Using Ipython for presentations

A short video showing how to use Ipython for presentations

```
from IPython.display import YouTubeVideo
YouTubeVideo('F4rFuIb1Ie4')
```

```
<iframe
    width="400"
    height="300"
    src="https://www.youtube.com/embed/F4rFuIb1Ie4"
    frameborder="0"
    allowfullscreen
></iframe>
```

```
## PDF output using pandoc
```

```
import os
```

```
### Export this notebook as markdown
```

```
commandLineSyntax = 'ipython nbconvert --to markdown 20150916_OGC_Reuse_under_licence.ipynb'
print (commandLineSyntax)
```

```
os.system(commandLineSyntax)
```

```
### Export this notebook and the document header as PDF using Pandoc
```

```
commandLineSyntax = 'pandoc -f markdown -t latex -N -V geometry:margin=1in DocumentHeader.md 20150916_OGC_
```

```
os.system(commandLineSyntax)
```

```
ipython nbconvert --to markdown 20150916_OGC_Reuse_under_licence.ipynb
```

0

1.3 The environment

In order to replicate my environment you need to know what I have installed!

1.3.1 Set up watermark

This describes the versions of software used during the creation.

Please note that critical libraries can also be watermarked as follows:

```
%watermark -v -m -p numpy,scipy
```

```
%install_ext https://raw.githubusercontent.com/rasbt/python_reference/master/ipython_magic/watermark.py
%load_ext watermark
```

Installed watermark.py. To use it, type:

```
%load_ext watermark
```

```
%watermark -a "Anthony Beck" -d -v -m -g
```

Anthony Beck 29/06/2015

CPython 2.7.10
IPython 3.2.0

```
compiler    : GCC 4.4.7 20120313 (Red Hat 4.4.7-1)
system      : Linux
release     : 3.13.0-37-generic
machine     : x86_64
processor   : x86_64
CPU cores   : 4
interpreter: 64bit
Git hash    :
```

```
#List of installed conda packages
!conda list
```

```
# packages in environment at /home/arb/LocalPython/Anaconda27/anaconda:
#
```

_license	1.1	py27_0
abstract-rendering	0.5.1	np19py27_0
accelerate	1.11.0	np19py27_p0
affine	1.1.0	py27_0
alabaster	0.7.3	py27_0
anaconda	2.2.0	np19py27_0
argcomplete	0.8.4	py27_0
arrow	0.5.4	<pip>
astroid	1.3.6	<pip>
astropy	1.0.2	np19py27_0
babel	1.3	py27_0
backports.ssl-match-hostname	3.4.0.2	<pip>
basemap	1.0.7	np19py27_0
bcolz	0.8.1	np19py27_0
beautiful-soup	4.3.2	py27_0
beautifulsoup4	4.3.2	<pip>
binstar	0.10.3	py27_0
bitarray	0.8.1	py27_0
blaze	0.8.0	<pip>
blaze-core	0.8.0	np19py27_0
blz	0.6.2	np19py27_0
bokeh	0.8.2	np19py27_0
boto	2.38.0	py27_0
bottle	0.12.7	py27_0
brewer2mpl	1.4	py27_0
cairo	1.12.18	4
cartopy	0.10.0	np18py27_0
cdecimal	2.3	py27_0
certifi	14.05.14	py27_0
cffi	0.9.2	py27_0
click	4.0	py27_0
cligj	0.1.0	py27_0
cloog	0.18.0	0
clyent	0.3.4	py27_0
colorama	0.3.3	py27_0
conda	3.14.0	py27_0
conda-build	1.12.1	py27_0
conda-env	2.2.3	py27_0
configobj	5.0.6	py27_0
cryptography	0.8.2	py27_0
cudatoolkit	6.0	p0
curl	7.38.0	0
cython	0.22	py27_0
cytoolz	0.7.2	py27_0
datashape	0.4.5	np19py27_0
dateutil	2.4.1	py27_0
decorator	3.4.0	py27_0
descartes	1.0.1	py27_0
docutils	0.12	py27_0
dynd-python	0.6.5	np19py27_0
enum	0.4.4	<pip>
enum34	1.0.4	py27_0
fastcache	1.0.2	py27_0
fiona	1.5.1	np19py27_0

flask	0.10.1	py27_1
fontconfig	2.11.1	4
freetype	2.5.2	2
funcsigs	0.4	py27_0
futures	2.2.0	py27_0
gdal	1.11.2	np19py27_2
geopandas	0.1.1	py27_0
geopy	1.10.0	<pip>
geos	3.3.3	0
gevent	1.0.1	py27_0
gevent-websocket	0.9.3	py27_0
glib	2.43.0	2
gmp	5.1.2	2
greenlet	0.4.6	py27_0
grin	1.2.1	py27_1
h5py	2.5.0	np19py27_0
harfbuzz	0.9.35	6
hdf5	1.8.14	0
html5lib	0.99999	<pip>
ipython	3.2.0	py27_0
ipython-notebook	3.2.0	py27_0
ipython-qtconsole	3.1.0	py27_0
isl	0.12.2	0
itsdangerous	0.24	py27_0
jdcal	1.0	py27_0
jedi	0.8.1	py27_0
jinja2	2.7.3	py27_1
jpeg	8d	0
jsonschema	2.4.0	py27_0
libdynd	0.6.5	0
libffi	3.0.13	0
libgcc	4.8.4	1
libgdal	1.11.2	0
libnetcdf	4.3.2	1
libpng	1.6.17	0
libsodium	0.4.5	0
libtiff	4.0.2	1
libxml2	2.9.0	0
libxslt	1.1.28	0
llvmlite	0.4.0	py27_0
logilab-common	0.63.2	<pip>
lxml	3.4.4	py27_0
mapnik	0.1	<pip>
markupsafe	0.23	py27_0
matplotlib	1.4.3	np19py27_2
mistune	0.6	py27_0
mkl	11.1	np19py27_p3
mkl-rt	11.1	p0
mkl-service	1.0.0	py27_p1
mklfft	2.0	np19py27_p0
mock	1.0.1	py27_0
mpc	1.0.1	0
mpfr	3.1.2	0
multipledispatch	0.4.7	py27_0

ncurses	5.9	4
networkx	1.9.1	py27_0
nltk	3.0.2	np19py27_0
nose	1.3.6	py27_0
notedown	1.4.4	<pip>
numba	0.18.2	np19py27_1
numbapro	0.18.0	np19py27_p2
numbapro_cudalib	0.2	0
numexpr	2.3.1	np19py27_p0 [mkl]
numpy	1.9.2	py27_p0 [mkl]
odo	0.3.2	np19py27_0
openpyxl	2.0.2	py27_0
openssl	1.0.1k	1
pandana	0.1.2	py27_0
pandas	0.16.2	np19py27_0
pandasql	0.6.2	np19py27_0
pandoc-attributes	0.1.7	<pip>
pandocfilters	1.2.4	<pip>
pango	1.36.8	3
patchelf	0.6	0
patsy	0.3.0	np19py27_0
pcre	8.31	0
pep8	1.6.2	py27_0
pillow	2.7.0	py27_1
pip	7.0.3	py27_0
pixman	0.26.2	0
plotly	1.6.17	<pip>
ply	3.6	py27_0
prettyplotlib	0.1.7	<pip>
prettytable	0.7.2	py27_0
proj4	4.8.0	0
psutil	2.2.1	py27_0
ptyprocess	0.4	py27_0
py	1.4.26	py27_0
py2cairo	1.10.0	py27_2
pyasn1	0.1.7	py27_0
pycosat	0.6.1	py27_0
pycparser	2.12	py27_0
pycrypto	2.6.1	py27_0
pycurl	7.19.5.1	py27_0
pyflakes	0.8.1	py27_0
pygments	2.0.2	py27_0
pylint	1.4.3	<pip>
pymc	2.3.4	np19py27_p0 [mkl]
pyopenssl	0.15.1	py27_0
pyparsing	2.0.3	py27_0
pypyj	1.9.3	py27_0
pyqt	4.11.3	py27_1
pysal	1.6.0	np19py27_1
pyshp	1.2.1	<pip>
pytables	3.1.1	np19py27_2
pytest	2.7.0	py27_0
python	2.7.10	0
python-dateutil	2.4.2	py27_0

pytz	2015.4	py27_0
pyyaml	3.11	py27_1
pymq	14.7.0	py27_0
qt	4.8.6	3
r	3.1.3	0
r-base	3.1.3	2
r-boot	1.3_16	r3.1.3_0
r-class	7.3_12	r3.1.3_0
r-cluster	1.15.3	0
r-codetools	0.2_11	r3.1.3_0
r-foreign	0.8_63	r3.1.3_0
r-kernsmooth	2.23_14	r3.1.3_0
r-lattice	0.20_31	r3.1.3_0
r-mass	7.3.37	0
r-matrix	1.2_1	r3.1.3_0
r-mgcv	1.8_6	r3.1.3_0
r-nlme	3.1.118	0
r-nlme	3.1_120	r3.1.3_0
r-nnet	7.3_9	r3.1.3_0
r-recommended	3.1.3	0
r-rpart	4.1_9	r3.1.3_0
r-spatial	7.3_9	r3.1.3_0
r-survival	2.38_2	r3.1.3_0
rasterio	0.15.1	py27_0
readline	6.2	2
redis	2.6.9	0
redis-py	2.10.3	py27_0
requests	2.7.0	py27_0
rope	0.9.4	py27_1
rpy2	2.5.6	py27_0
runipy	0.1.3	py27_0
scikit-image	0.11.3	np19py27_0
scikit-learn	0.16.1	np19py27_p0 [mkl]
scipy	0.15.1	np19py27_p0 [mkl]
seaborn	0.5.1	<pip>
setuptools	17.1.1	py27_0
shapely	1.5.9	<pip>
simplejson	3.6.3	py27_0
singledispatch	3.4.0.3	py27_1
sip	4.16.5	py27_0
six	1.9.0	py27_0
snowballstemmer	1.2.0	py27_0
snuggs	1.3.1	<pip>
sockjs-tornado	1.0.1	py27_0
sphinx	1.3.1	py27_0
sphinx-rtd-theme	0.1.7	<pip>
sphinx_rtd_theme	0.1.7	py27_0
spyder	2.3.4	py27_1
spyder-app	2.3.4	py27_0
sqlalchemy	1.0.3	py27_0
sqlite	3.8.4.1	1
sqlparse	0.1.14	py27_0
ssl_match_hostname	3.4.0.2	py27_0
statsmodels	0.6.1	np19py27_0

sympy	0.7.6	py27_0
system	5.8	2
tables	3.1.1	<pip>
terminado	0.5	py27_0
theano	0.7.0	np19py27_0
tk	8.5.18	0
toolz	0.7.2	py27_0
tornado	4.2	py27_0
tweepy	2.3	py27_0
twitter	1.17.0	<pip>
ujson	1.33	py27_0
unicodecsv	0.9.4	py27_0
urbansim	2.0.1	<pip>
util-linux	2.21	0
werkzeug	0.10.4	py27_0
xlrd	0.9.3	py27_0
xlsxwriter	0.7.2	py27_0
xlwt	1.0.0	py27_0
yaml	0.1.6	0
zeromq	4.0.5	0
zlib	1.2.8	0

```
#List of installed pip packages
!pip list

abstract-rendering (0.5.1)
affine (1.1.0)
alabaster (0.7.3)
argcomplete (0.8.4)
arrow (0.5.4)
astroid (1.3.6)
astropy (1.0.2)
Babel (1.3)
backports.ssl-match-hostname (3.4.0.2)
basemap (1.0.7)
bcolz (0.8.1)
beautifulsoup4 (4.3.2)
binstar (0.10.3)
bitarray (0.8.1)
blaze (0.8.0)
blz (0.6.2)
bokeh (0.8.2)
boto (2.38.0)
bottle (0.12.7)
brewer2mpl (1.4.1)
Cartopy (0.10.0)
cdecimal (2.3)
certifi (14.5.14)
cffi (0.9.2)
click (4.0)
cligj (0.1.0)
clyent (0.3.4)
```

```
colorama (0.3.3)
conda (3.14.0)
conda-build (1.12.1)
conda-env (2.2.3)
configobj (5.0.6)
cryptography (0.8.2)
Cython (0.22)
cytoolz (0.7.2)
databricks (0.4.5)
decorator (3.4.0)
descartes (1.0.1)
docutils (0.12)
enum (0.4.4)
enum34 (1.0.4)
fastcache (1.0.2)
Fiona (1.5.1)
Flask (0.10.1)
funcsigs (0.4)
futures (2.2.0)
GDAL (1.11.2)
geopandas (0.1.1)
geopy (1.10.0)
gevent (1.0.1)
gevent-websocket (0.9.3)
greenlet (0.4.6)
grin (1.2.1)
h5py (2.5.0)
html5lib (0.99999)
ipython (3.2.0)
itsdangerous (0.24)
jdcal (1.0)
jedi (0.8.1)
Jinja2 (2.7.3)
jsonschema (2.4.0)
llvmlite (0.4.0)
logilab-common (0.63.2)
lxml (3.4.4)
mapnik (0.1)
MarkupSafe (0.23)
matplotlib (1.4.3)
mistune (0.6)
mklfft (0.0.0)
mock (1.0.1)
multipledispatch (0.4.7)
networkx (1.9.1)
nltk (3.0.2)
nose (1.3.6)
notedown (1.4.4)
numba (0.18.2)
numbapro (0.18.0)
numexpr (2.3.1)
numpy (1.9.2)
odo (0.3.2)
openpyxl (2.0.2)
```

pandana (0.1.2)
pandas (0.16.2)
pandasql (0.6.2)
pandoc-attributes (0.1.7)
pandocfilters (1.2.4)
patsy (0.3.0)
pep8 (1.6.2)
Pillow (2.7.0)
pip (7.0.3)
plotly (1.6.17)
ply (3.6)
prettyplotlib (0.1.7)
prettytable (0.7.2)
psutil (2.2.1)
ptyprocess (0.4)
py (1.4.26)
pyasn1 (0.1.7)
pycosat (0.6.1)
pycparser (2.12)
pycrypto (2.6.1)
pycurl (7.19.5.1)
pyflakes (0.8.1)
Pygments (2.0.2)
pylint (1.4.3)
pymc (2.3.4)
pyOpenSSL (0.15.1)
pyparsing (2.0.3)
pyproj (1.9.4)
PySAL (1.6.0)
pyshp (1.2.1)
pytest (2.7.0)
python-dateutil (2.4.2)
pytz (2015.4)
PyYAML (3.11)
pyzmq (14.7.0)
rasterio (0.23.0)
redis (2.10.3)
requests (2.7.0)
rope (0.9.4)
rpy2 (2.5.6)
runipy (0.1.3)
scikit-image (0.11.3)
scikit-learn (0.16.1)
scipy (0.15.1)
seaborn (0.5.1)
setuptools (17.1.1)
Shapely (1.5.9)
simplejson (3.6.3)
singledispatch (3.4.0.3)
six (1.9.0)
snowballstemmer (1.2.0)
snuggs (1.3.1)
sockjs-tornado (1.0.1)
Sphinx (1.2.3)

```
sphinx-rtd-theme (0.1.7)
spyder (2.3.4)
SQLAlchemy (1.0.3)
sqlparse (0.1.14)
statsmodels (0.6.1)
sympy (0.7.6)
tables (3.1.1)
terminado (0.5)
Theano (0.7.0)
toolz (0.7.2)
tornado (4.2)
tweepy (2.3.0)
twitter (1.17.0)
ujson (1.33)
unicodecsv (0.9.4)
urbansim (2.0.1)
Werkzeug (0.10.4)
xlrd (0.9.3)
XlsxWriter (0.7.2)
xlwt (1.0.0)
```

1.4 Running dynamic presentations

You need to install the [RISE Ipython Library](#) from Damián Avila for dynamic presentations

To convert and run this as a static presentation run the following command:

```
!ipython nbconvert 20150916_OGC_Reuse_under_licence.ipynb --to slides --post serve

[NbConvertApp] Converting notebook 20150916_OGC_Reuse_under_licence.ipynb to slides
[NbConvertApp] Writing 259748 bytes to 20150916_OGC_Reuse_under_licence.slides.html
[NbConvertApp] Redirecting reveal.js requests to https://cdn.jsdelivr.net/reveal.js/2.6.2
Serving your slides at http://127.0.0.1:8000/20150916_OGC_Reuse_under_licence.slides.html
Use Control-C to stop this server
Created new window in existing browser session.
WARNING:tornado.access:404 GET /custom.css (127.0.0.1) 2.95ms
WARNING:tornado.access:404 GET /favicon.ico (127.0.0.1) 1.49ms
```

To close this instances press *control ‘c’* in the *ipython notebook* terminal console

Static presentations allow the presenter to see *speakers notes* (use the ‘s’ key)

If running dynamically run the scripts below

1.5 Pre load some useful libraries

```
#Future proof python 2
from __future__ import print_function #For python3 print syntax
from __future__ import division

# def
import IPython.core.display
```

```

# A function to collect user input - ipynb_input(varname='username', prompt='What is your username')

def ipynb_input(varname, prompt=''):
    """Prompt user for input and assign string val to given variable name."""
    js_code = """
        var value = prompt("{prompt}", "");
        var py_code = "{varname} = '" + value + "'";
        IPython.notebook.kernel.execute(py_code);
    """.format(prompt=prompt, varname=varname)
    return IPython.core.display.Javascript(js_code)

# inline

%pylab inline

Populating the interactive namespace from numpy and matplotlib

```

1.6 About me



Figure 3: It's all about me - details about Anthony Beck

- Research Fellow, University of Nottingham: [orcid](#)
- Director, Geolytics Limited - A spatial data analytics consultancy

2 In the beginning was the geoword

and the word was *cartography*

The lens of cartography - A top down representation of spatial knowledge

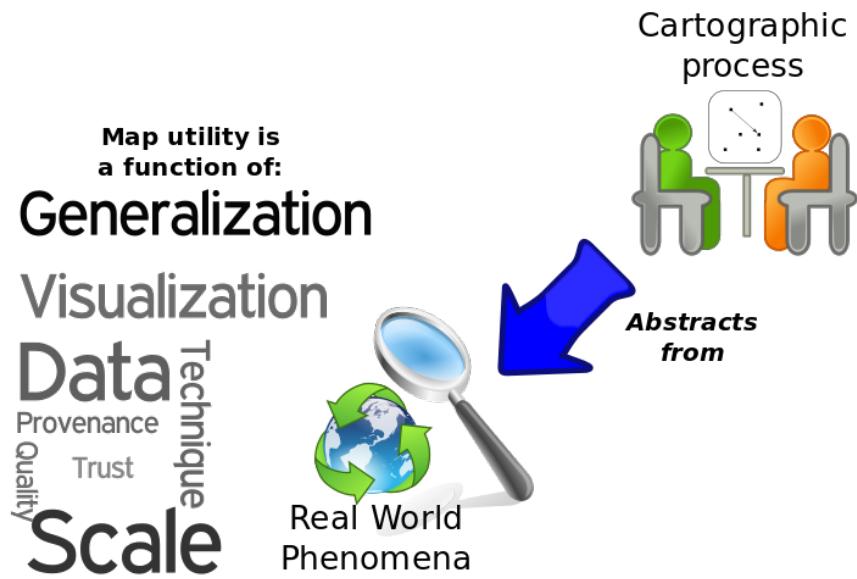


Figure 4: The lens of cartography Beck (2015g)



Figure 5: A static map (public domain)

Cartography was king. Static representations of spatial knowledge with the cartographer deciding what to represent.

3 And then there was data



Figure 6: Data Beck (2015h)

At the end of the 20th Century National Mapping and Cadastral agencies characterised by:

Heterogeneous and incompatible data



*Syntactic - data flavours
Schematic - data designs
Semantic - data description*



Restrictive licences



Figure 7: But the data was siloed (restricted use)

Restrictive data

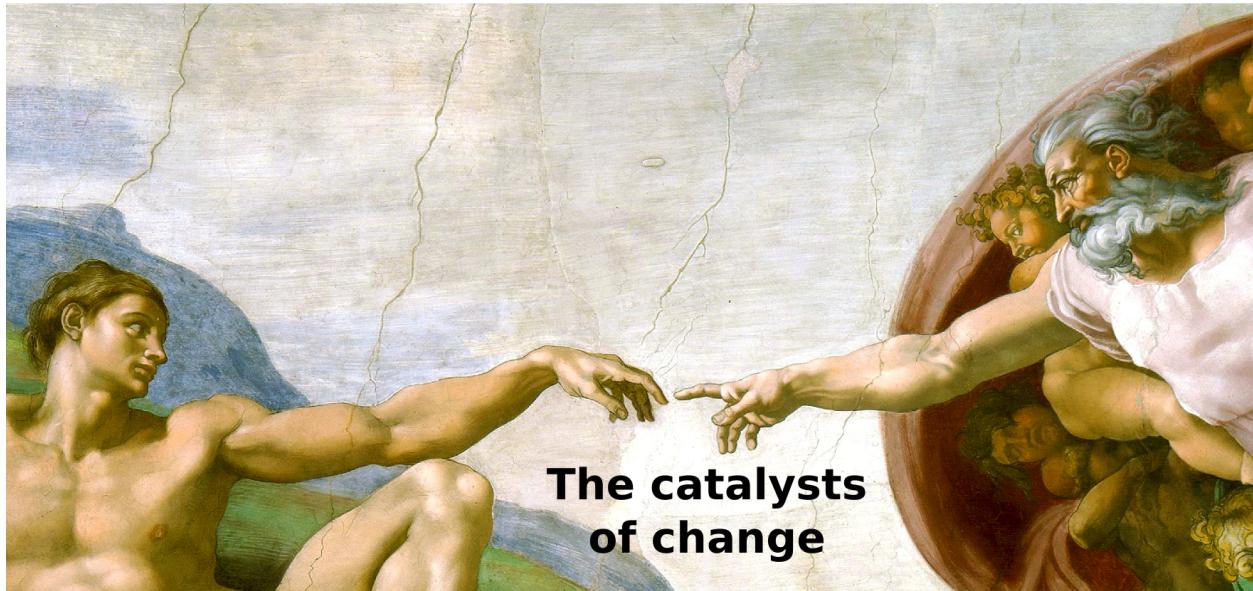


Figure 8: Concerted efforts to de-silo data and make data interoperable (restricted use)

Making data interoperable and open

4 Technical interoperability - levelling the field

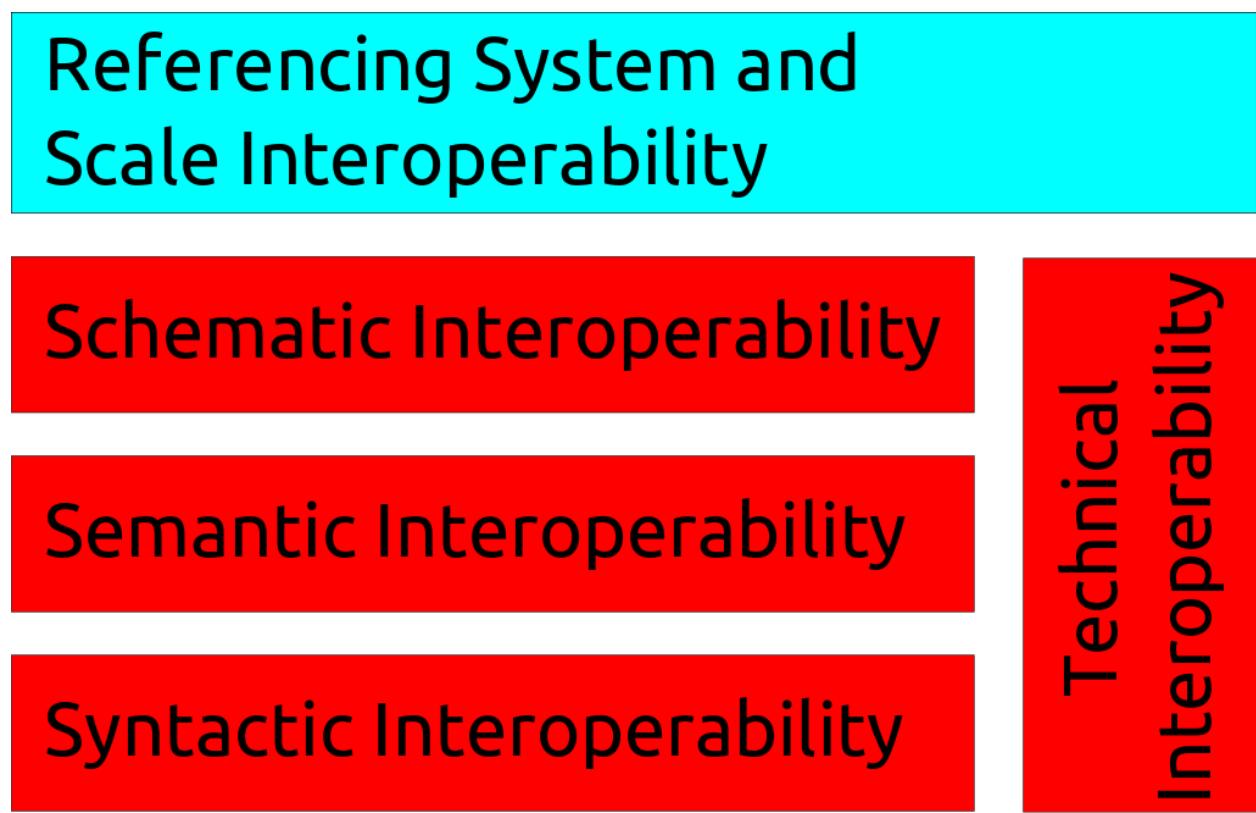


Figure 9: Interoperable integration of spatial data - the technological issues Beck (2015d)

4.1 Facilitating data driven visualization

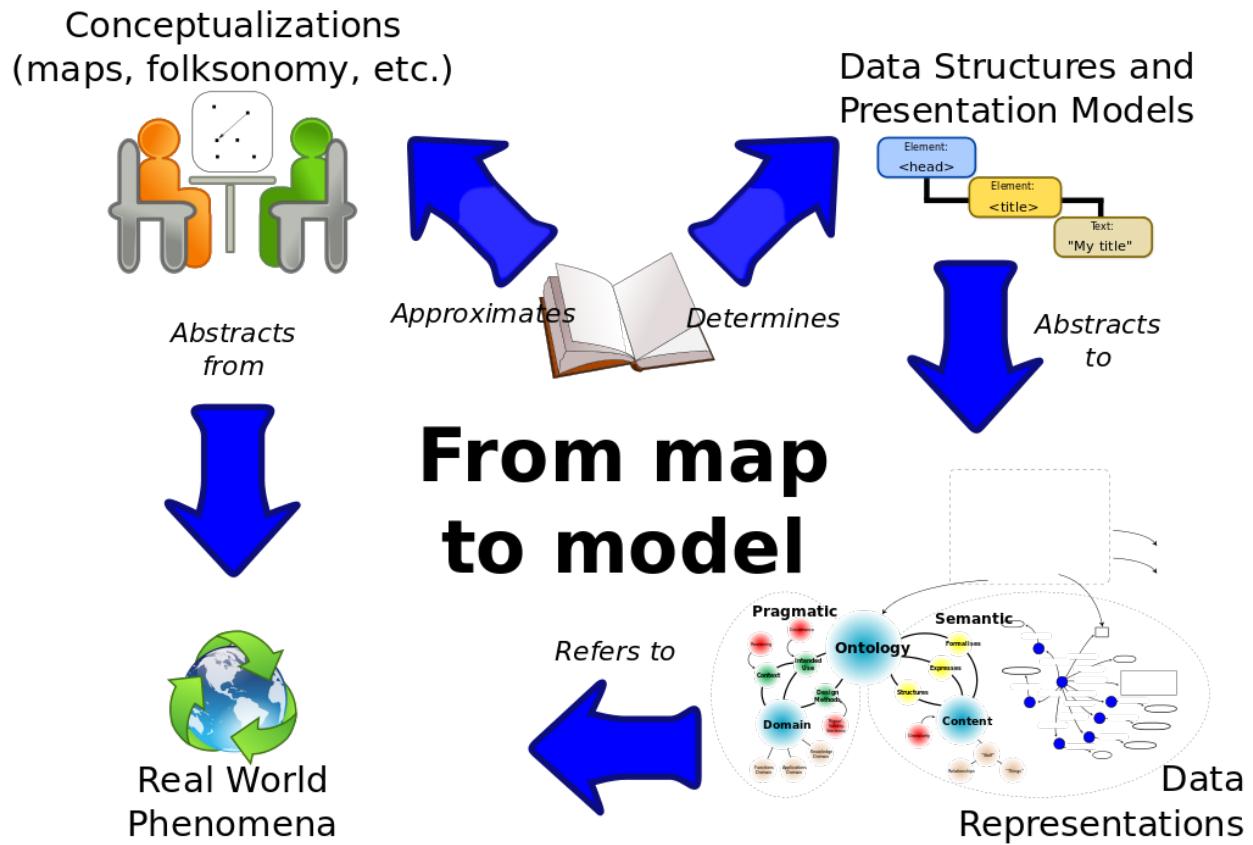


Figure 10: From Map to Model The changing paradigm of map creation from cartography to data driven visualization Beck (2015c)

From Map to Model The changing paradigm of map creation from cartography to data driven visualization

Encouraging re-use and impact across society

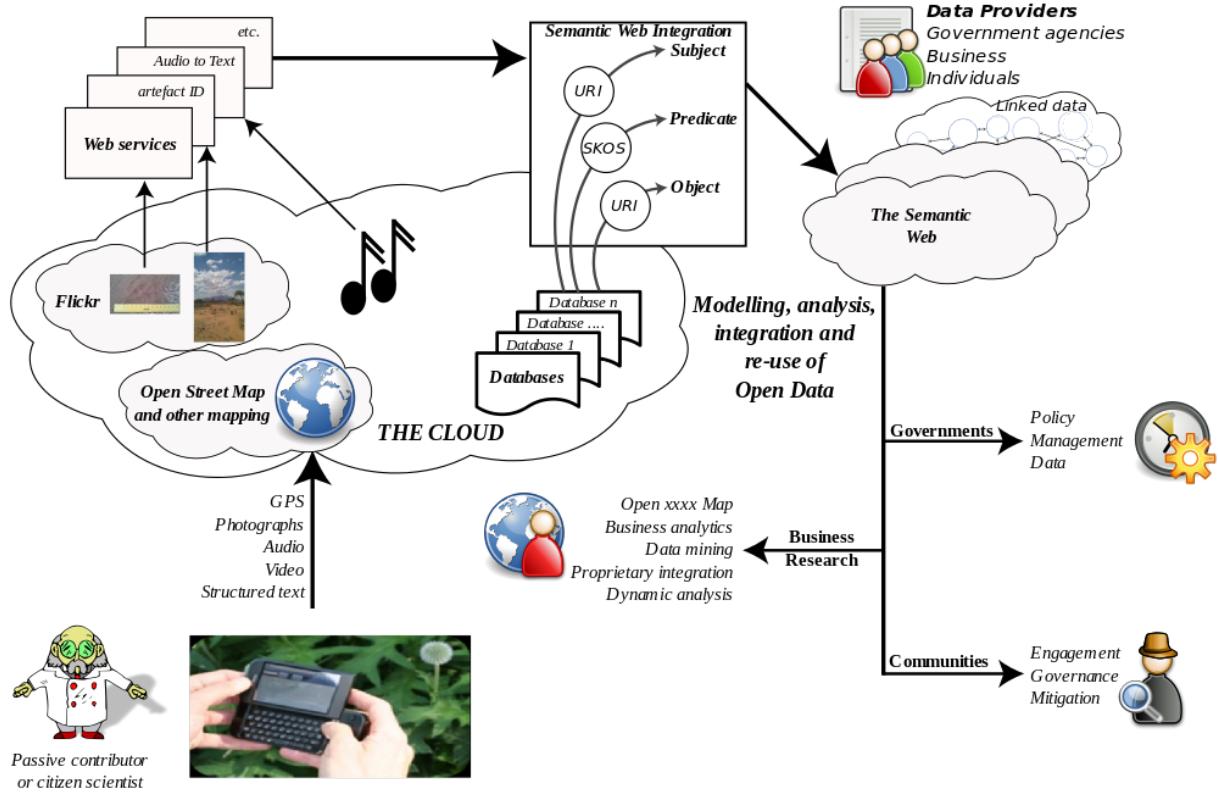


Figure 11: Local To Global integration of data to create multiple generic products Beck (2015e)

Providing a new working paradigm



Decoupled bottom up approaches are possible

Figure 12: A new working paradigm (public domain)

Cartography is no longer king

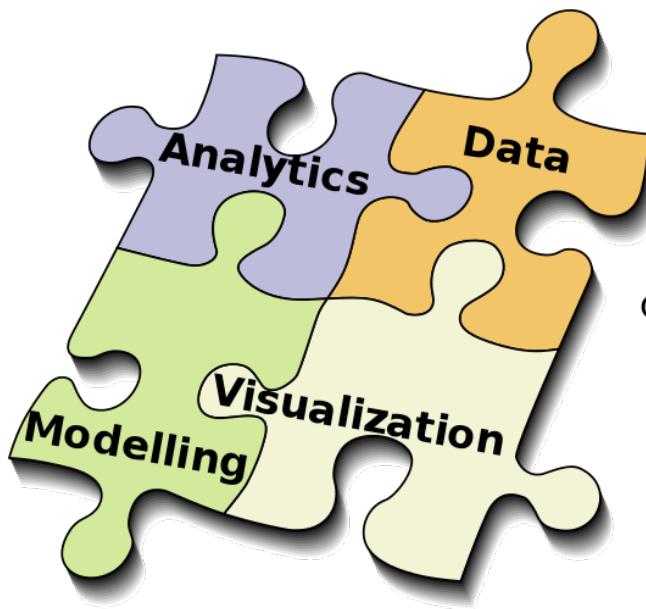
Good decisions will be based on data that is:

*Accurate
Authoritive
Assured*

Formal and informal data can satisfy this requirement

Key issues:

*Trust
Provenance
Credibility
Timeliness
Fitness for purpose*



Spatial is no longer special

Figure 13: Cartography is no longer key. Spatial mapping is now about the the formal and informal data stack. Elements such as provenance, credibility are much more important for use and re-use of this data. Beck (2015b)

5 What about non-technical interoperability issues?

Issues surrounding non-technical interoperability include:

- Policy interoperability
- Licence interoperability
- Legal interoperability
- Social interoperability

We will focus on licence interoperability

Referencing System and Scale Interoperability

Schematic Interoperability

Semantic Interoperability

Syntactic Interoperability

Policy Interoperability

Licence Interoperability

Legal Interoperability

Social Interoperability

Technical
Interoperability

Non technical
Interoperability

Interoperable integration

Figure 14: The full stack that enables interoperable integration of spatial data Beck (2015f)

Re-use under licence:

what use is quality if your product is illegal?



Date: 20150916

Venue: OGC Conference

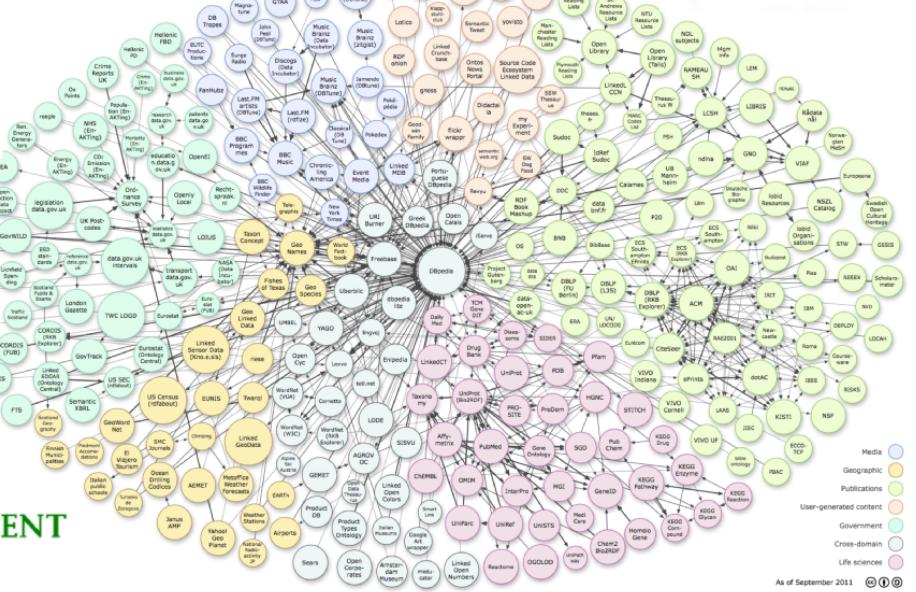


Figure 15: The modern data landscape (restricted)

There is a multitude of formal and informal data.

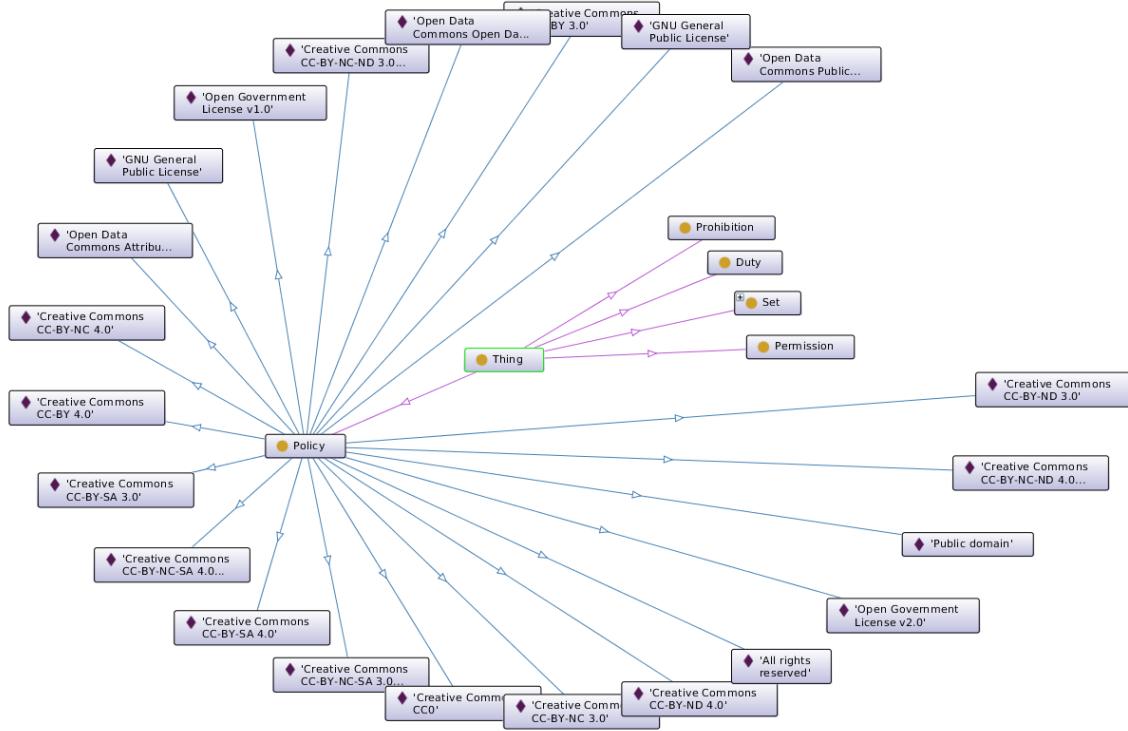


Figure 16: Some licences (Anon. n.d.)

Each of these data objects can be licenced in a different way. This shows some of the licences described by the RDLicence ontology

5.1 What is a licence?

Wikipedia state:

A license may be granted by a party (“licensor”) to another party (“licensee”) as an element of an agreement between those parties.

A shorthand definition of a license is “an authorization (by the licensor) to use the licensed material (by the licensee).”

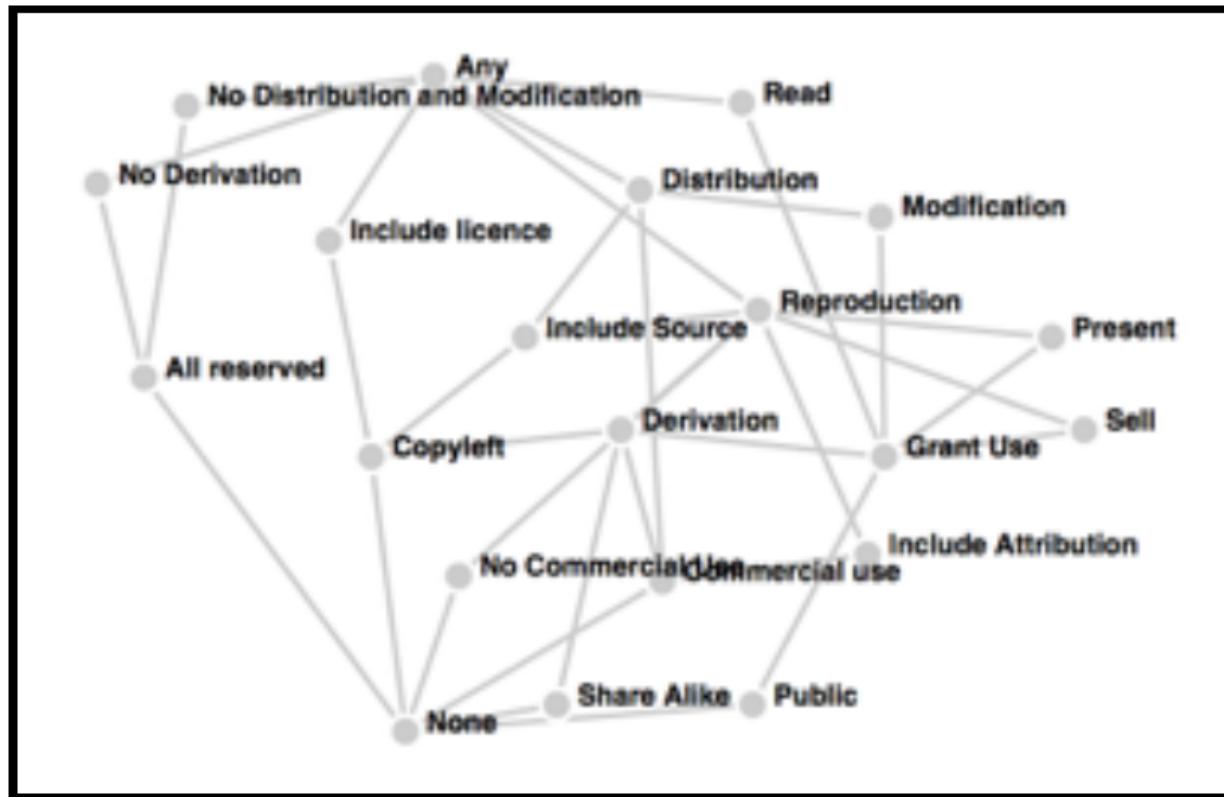


Figure 17: A licence describes what you can and cannot do to a data object (Anon. n.d.)

Two lead organisations have developed legal frameworks for content licensing:

- [Creative Commons \(CC\)](#) and
- [Open Data Commons \(ODC\)](#).

Until the release of [CC version 4](#), published in November 2013, the CC licence did not cover data. Between them, CC and ODC licences can cover all forms of digital work.

There are many others - many bespoke.



Figure 18: Creative Commons Gianni (2008)

I'll describe CC in more detail

5.2 Creative Commons Zero

Creative Commons Zero (CC0) is essentially public domain which allows:

- Reproduction
- Distribution
- Derivations

5.2.1 Constraints on CC0

The following clauses constrain CC0:

- Permissions
 - ND – No derivatives: the licensee can not derive new content from the resource.
- Requirements
 - BY – By attribution: the licensee must attribute the source.
 - SA – Share-alike: if the licensee adapts the resource, it must be released under the same licence.
- Prohibitions
 - NC – Non commercial: the licensee must not use the work commercially without prior approval.

5.2.2 CC license combinations

Table 1: [Creative Commons license combinations](#)

License	Reproduction	Distribution	Derivation	ND	BY	SA	NC
CC0	X	X	X				
CC-BY-ND	X	X		X	X		
CC-BY-NC-ND	X	X		X	X		X
CC-BY	X	X	X		X		
CC-BY-SA	X	X	X		X	X	
CC-BY-NC	X	X	X		X		X
CC-BY-NC-SA	X	X	X		X	X	X

6 Why are licenses important?

It's all about license compatibility!

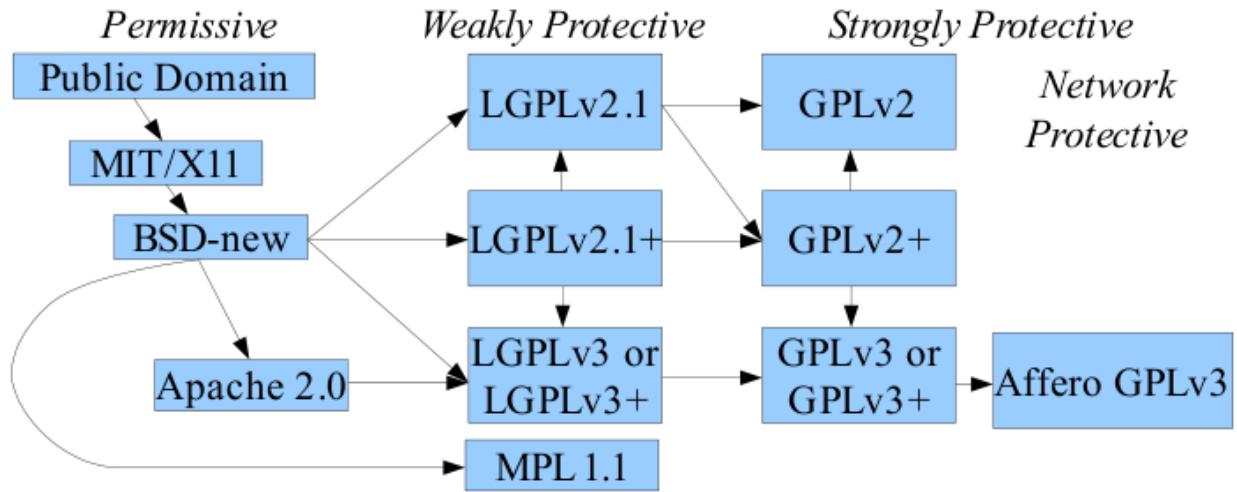


Figure 19: Compatibility of common open-source software licenses Wheeler (2007)

6.1 Which is important when we mash up data

Certain licences when combined:

- Are incompatible
 - Creating data islands
- Inhibit commercial exploitation (NC)
- Force the adoption of certain licences
 - If you want people to commercially exploit your stuff don't incorporate CC-BY-NC-SA data!
- Stops the derivation of *new works*

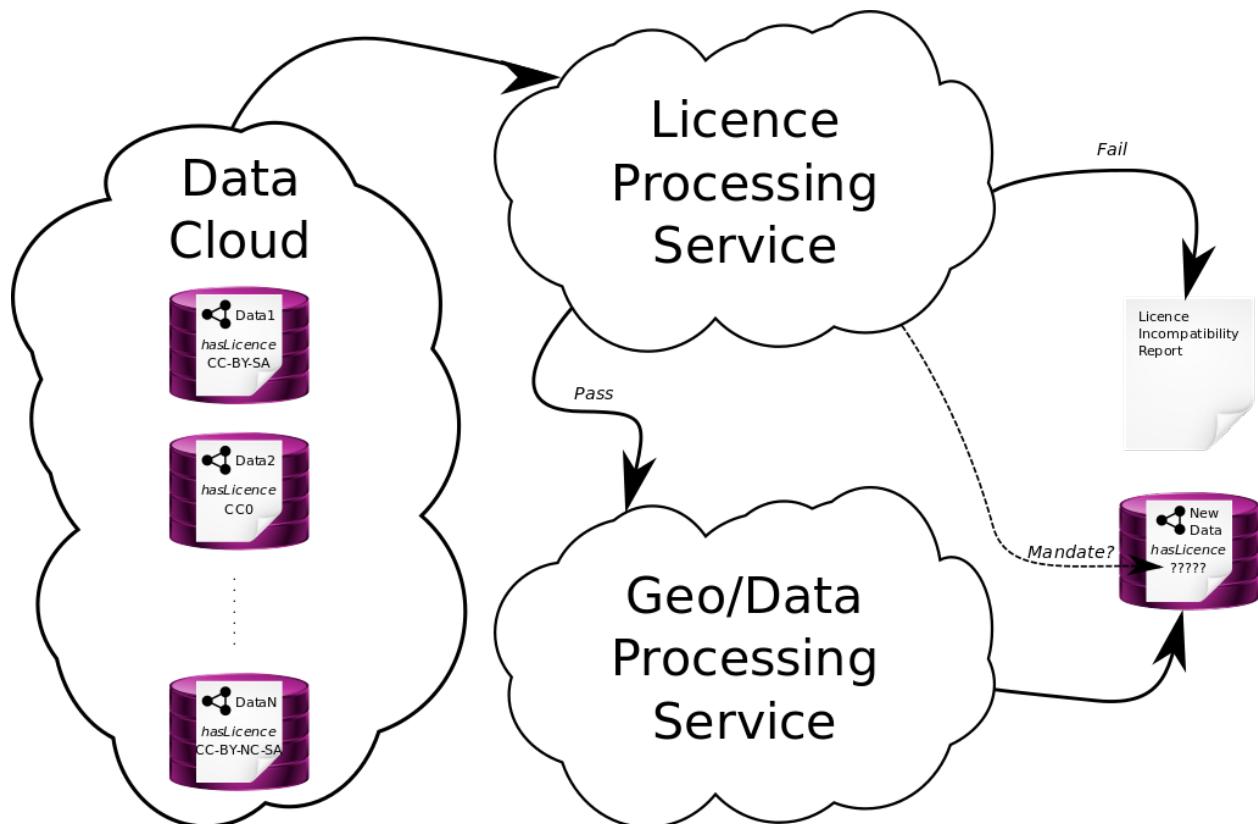


Figure 20: A conceptual licence processing workflow Beck (2015a)

A conceptual licence processing workflow. The licence processing service analyses the incoming licence metadata and determines if the data can be legally integrated and any resulting licence implications for the derived product.

7 A rudimentary logic example

Data1 isPartOf NewThing.

Data1 hasLicence a cc-by-sa.

What hasLicence a cc-by-sa? #reason here

If X isPartOf Y and hasLicence Z then Y hasLicence Z. #reason here

Data2 isPartOf NewThing.

Data2 hasLicence a cc-by-nc-sa. #reason here

Nothing hasLicence a cc-by-nc-sa and hasLicence a cc-by-sa. #reason here

And processing this within the Protege reasoning environment

```
from IPython.display import YouTubeVideo
YouTubeVideo('jUzGF401vLc')
```

```
<iframe
    width="400"
    height="300"
    src="https://www.youtube.com/embed/jUzGF401vLc"
    frameborder="0"
    allowfullscreen
></iframe>
```

7.1 Here's something I prepared earlier

A live presentation.....

```
from IPython.display import YouTubeVideo
YouTubeVideo('tkRB5Rp1_W4')
```

```
<iframe
    width="400"
    height="300"
    src="https://www.youtube.com/embed/tkRB5Rp1_W4"
    frameborder="0"
    allowfullscreen
></iframe>
```

8 OGC and Licence interoperability

- The geo business landscape is increasingly based on integrating heterogeneous data to develop new products
- Licence heterogeneity is a barrier to data integration and interoperability
- A licence calculus can help resolve and identify heterogeneities leading to
 - legal compliance
 - confidence
- Use of standards and collaboration with organisations is crucial
 - [Open Data Licensing ontology](#)
 - [The Open Data Institute](#)
- Failure to do this could lead to breaches in data licenses
 - and we all know where that puts us.....



Figure 21: Breaching a data license can be serious (restricted = randomly!)

9 Questions

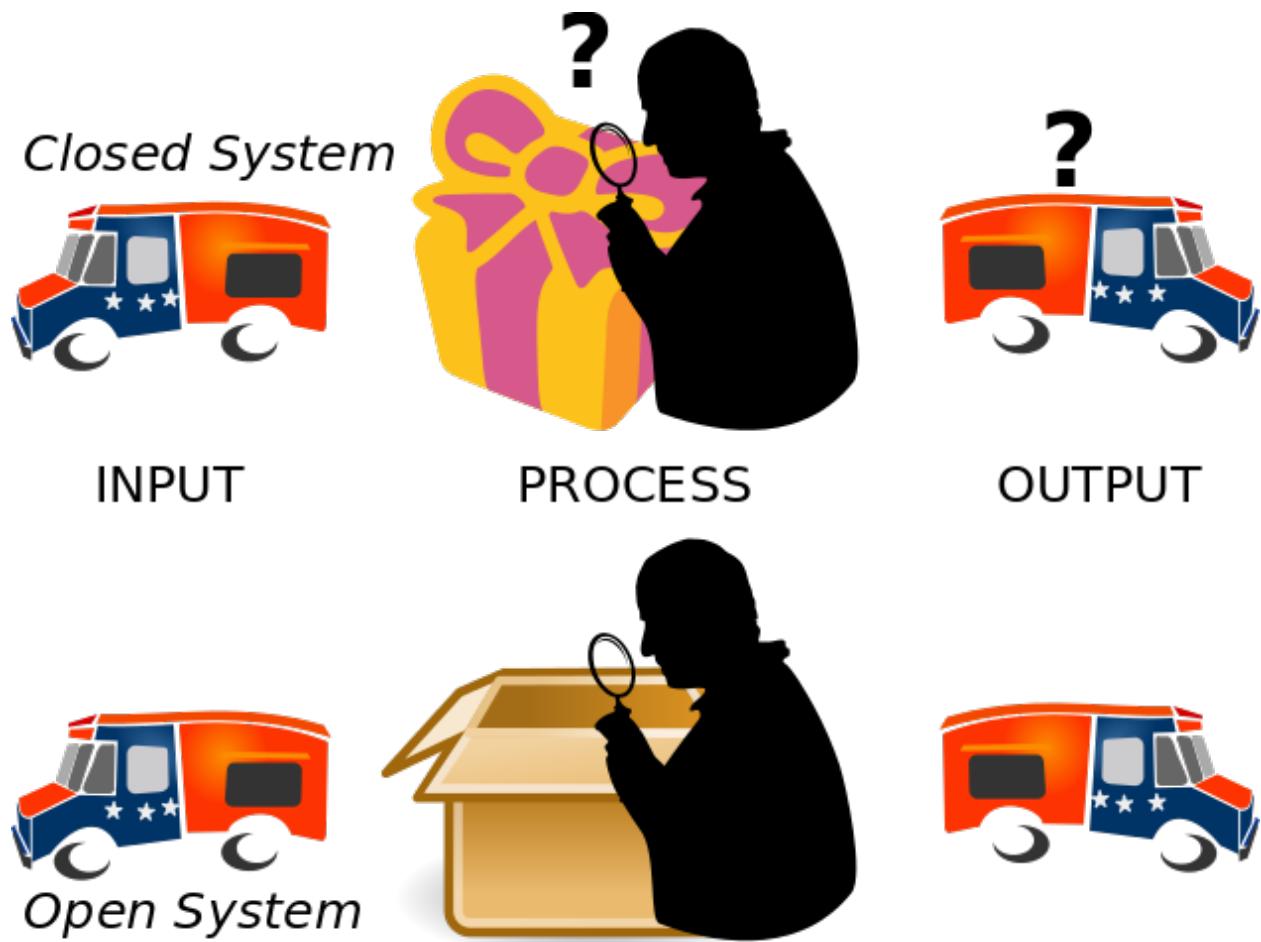


Figure 22: Processing transparency between open and closed systems

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