Efficient component analysis with FOSSology

Overview: Contents

1. **Introduction and overview**
   What is FOSSology
2. **Introduction and Basic Work Flow**
   What FOSSology is designed for
3. **Features to make you efficient**
   How to work efficiently
4. **Show time**
   Workflow demo
5. **Take aways**

What is FOSSology?

A Web server application for license and copyright compliance of software components.

FOSSology Project
https://www.fossology.org/

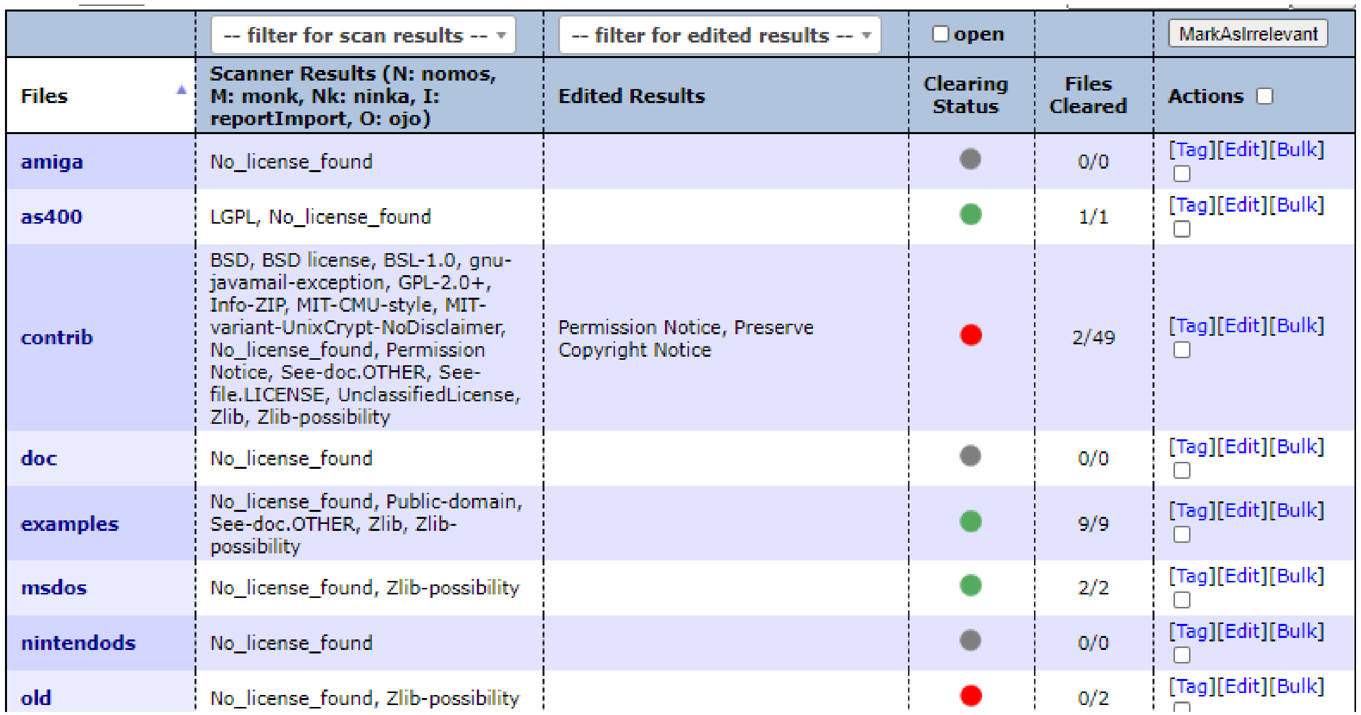
- Published first in 2008, GPL-2.0
- 2015: Linux Foundation collaboration project
- Web server based, command line interfaces and REST API
- Scanning agents searching for license and copyright relevant hits (and more …)
- A multi-user / multi-tenant Web UI for review

FOSSology Development
https://www.github.com/fossology/fossology

- Standard Web application stack:
  - Linux, Apache 2, PostgreSQL, PHP,
- Web-based UI in PHP, but scanners written in C / C++

FOSSology’s license analysis support

- FOSSology provides:
  - Finding license relevant texts
  - Aggregation in a hierarchy
  - Highlighting text occurrences
  - Identifying wording differences compared with reference texts
  - Searching for licensing phrases
  - Reporting of found licenses



	-- filter for scan results --	-- filter for edited results --	☐ open		MarkAsIrrelevant
Files	Scanner Results (N: nomos, M: monk, Nk: ninka, I: reportImport, O: ojo)	Edited Results	Clearing Status	Files Cleared	Actions ☐
amiga	No_license_found		●	0/0	[Tag][Edit][Bulk] ☐
as400	LGPL, No_license_found		🟢	1/1	[Tag][Edit][Bulk] ☐
contrib	BSD, BSD license, BSL-1.0, gnu-javamail-exception, GPL-2.0+, Info-ZIP, MIT-CMU-style, MIT-variant-UnixCrypt-NoDisclaimer, No_license_found, Permission Notice, See-doc.OTHER, See-file.LICENSE, UnclassifiedLicense, Zlib, Zlib-possibility	Permission Notice, Preserve Copyright Notice	🔴	2/49	[Tag][Edit][Bulk] ☐
doc	No_license_found		●	0/0	[Tag][Edit][Bulk] ☐
examples	No_license_found, Public-domain, See-doc.OTHER, Zlib, Zlib-possibility		🟢	9/9	[Tag][Edit][Bulk] ☐
msdos	No_license_found, Zlib-possibility		🟢	2/2	[Tag][Edit][Bulk] ☐
nintendods	No_license_found		●	0/0	[Tag][Edit][Bulk] ☐
old	No_license_found, Zlib-possibility		🔴	0/2	[Tag][Edit][Bulk] ☐

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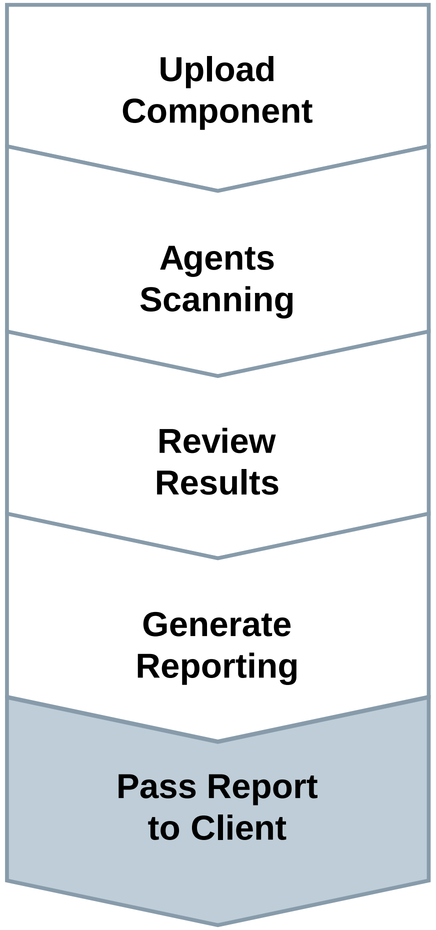
How does FOSSology work?



Upload Component

Agents Scanning

Review Results

Generate Reporting

Pass Report to Client

- Uploading source code archive (*.zip, *.tar.gz, etc)

- Agents scan for license relevant text (nomos, monk, ojo)
- Copyrights, ECC, your keywords to look for etc.

- Review scanner results for wrong license classification
- Review other scanner findings (copyrights, ECC)

- Result of the “clearing”
  - SPDX reporting
  - Generated notice or readme file
  - Debian-copyright
  - Document based report

Basic End-to-End Workflow

Functionality

1. **Using FOSSology End-to-End**
   - From uploading …
   - … to generating report: SPDX
2. **Uploading - offers a variety of selections**
3. **Review the uploaded file in the license browser**
4. **Review the found licenses in the aggregated view**
5. **Do the clearing work**
6. **Review the copyrights**
7. **Review the Export Control and Customs (ECC) phrases**
8. **Generate desired report output**

Basic End-to-End Workflow

Functionality

1. **Using FOSSology End-to-End**
   - From uploading …
   - … to generating report: SPDX
2. **Uploading - offers a variety of selections**
3. **Review the uploaded file in the license browser**
4. **Review the found licenses in the aggregated view**
5. **Do the clearing work**
6. **Review the copyrights**
7. **Review the Export Control and Customs (ECC)**
8. **Generate desired report output**

License analysis can’t be fully automated

```
/*******************************************************************************
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*
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* of this software and associated documentation files (the "Software"), to deal
* in the Software without restriction, including without limitation the rights
* to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
* copies of the Software, and to permit persons to whom the Software is
* furnished to do so, subject to the following conditions:
*
* The above copyright notice and this permission notice shall be included in
* all copies or substantial portions of the Software.
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* (b) that interact with a *** device through a bus or interconnect.
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* OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE
* SOFTWARE.
*
*******************************************************************************/
```

Real world example:

- It is actually based on an MIT license text
- MIT license: very popular and permissive
- Added two conditions inside the original license text
  - (not so permissive)
- Very hard to identify with regular expression matching

License analysis can’t be fully automated

```
/*************************************************************************************
* Copyright (C) 2008 - 2015 ***, Inc.  All rights reserved.
*
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* of this software and associated documentation files (the "Software"), to deal
* in the Software without restriction, including without limitation the rights
* to use, copy, modify, merge, publish, distribute, sublicense, and/or sell
* copies of the Software, and to permit persons to whom the Software is
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* The above copyright notice and this permission notice shall be included in
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* IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHAI
* FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EV
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* WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF
* OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE
* SOFTWARE.
*
*************************************************************************************/
```

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fossology

There is much creativity in expressing licenses

(from zlib-1.2.8.tar/ zlib-1.2.8/ contrib/ amd64/ amd64-match.S)

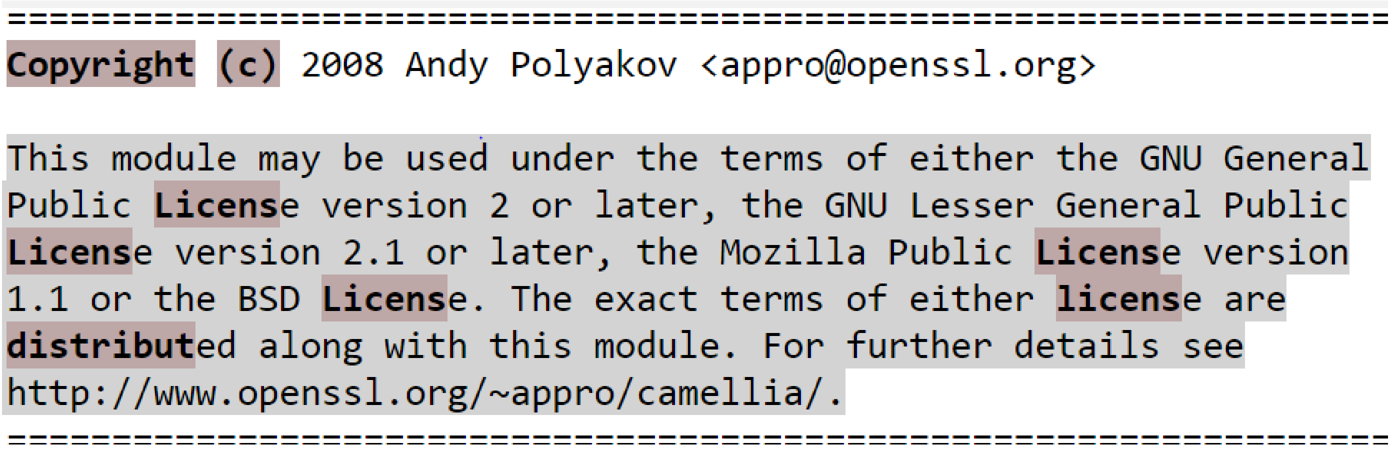
```
/*
 * match.S -- optimized version of longest_match()
 * based on the similar work by Gilles Vollant,
 * and Brian Raiter, written 1998
 *
 * This is free software; you can redistribute it and/or modify it
 * under the terms of the BSD License.
 * Use by owners of Che Guevarra
 * parafernalia is prohibited, where possible,
 * and highly discouraged
 * elsewhere.
 */
```

…

Another real world example:

- What was meant to be fun (or a political statement), is difficult for license analysis
- *Question: Can this be ignored or shall the origination check for ownership of referred parafernalia?*

Determining the correct license requires additional work



```
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This module may be used under the terms of either the GNU General
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1.1 or the BSD License. The exact terms of either license are
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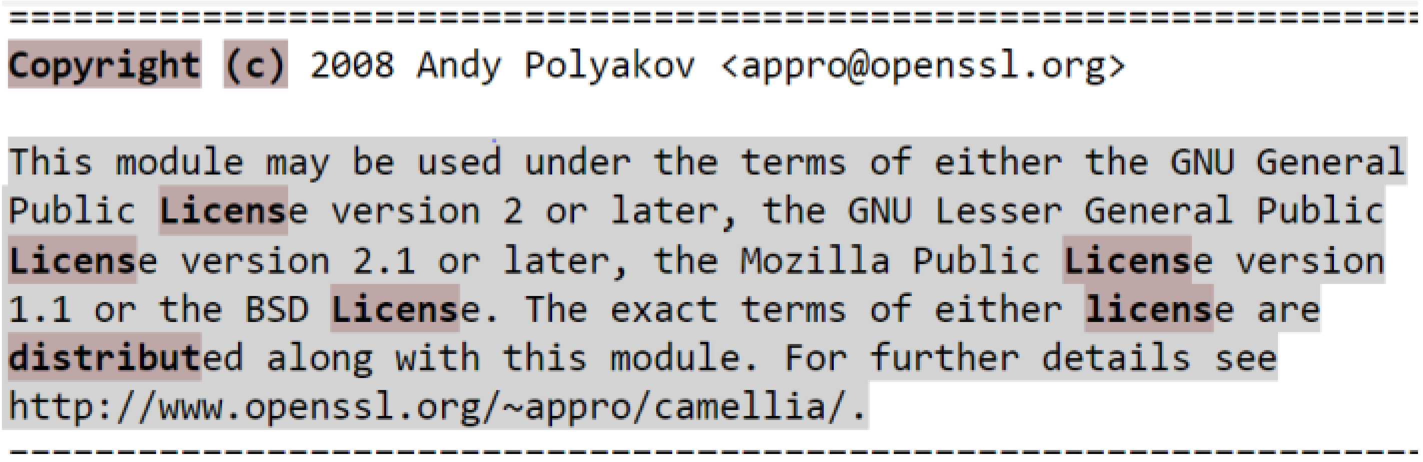
http://www.openssl.org/~appro/camellia/.
==================================================================
```

Determining the correct license requires additional work



```
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http://www.openssl.org/~appro/camellia/.
---------------------------------------------------------------------
```

Back to assembler. Just like NTT's this implementation is licensed under multiple licenses and may be used under the terms of either the GNU General Public License version 2 or later, the GNU Lesser General Public License version 2.1 or later, the Mozilla Public License version 1.1 or the BSD License. Licensing terms apply to downloadable tar-ball as whole, as well as to specific modules generated by platform scripts. In OpenSSL context usage is effectively governed by the BSD License.

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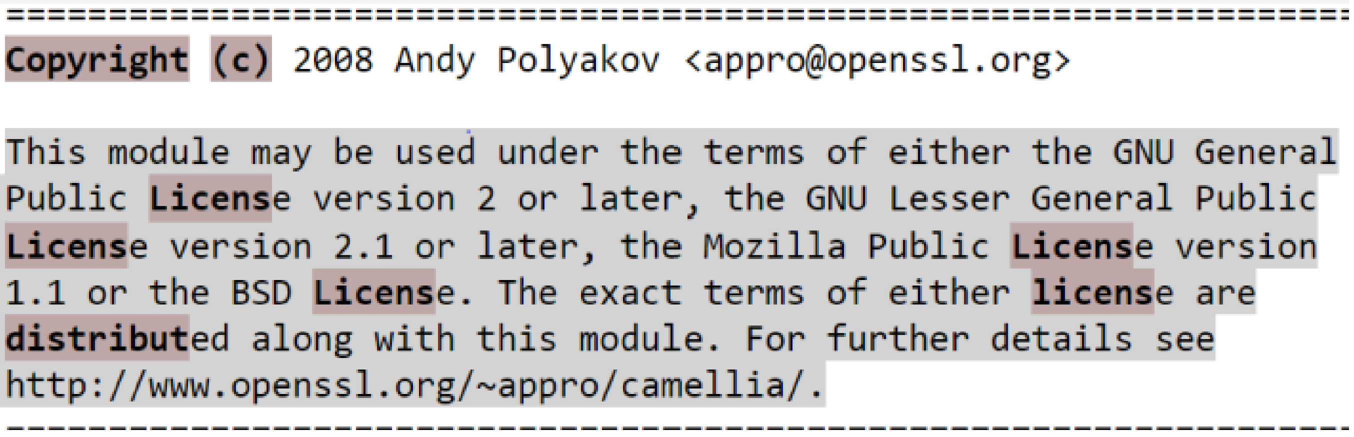

```
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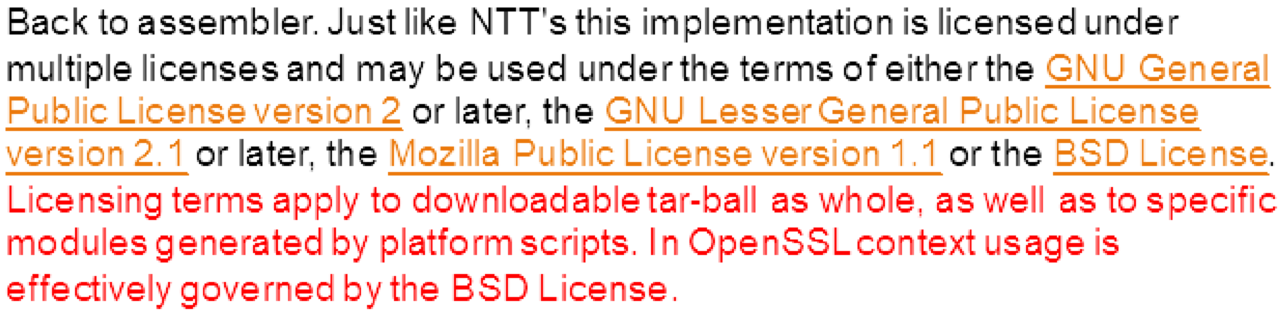
distributed along with this module. For further details see
http://www.openssl.org/~appro/camellia/.
--------------------------------------------------------------------
```



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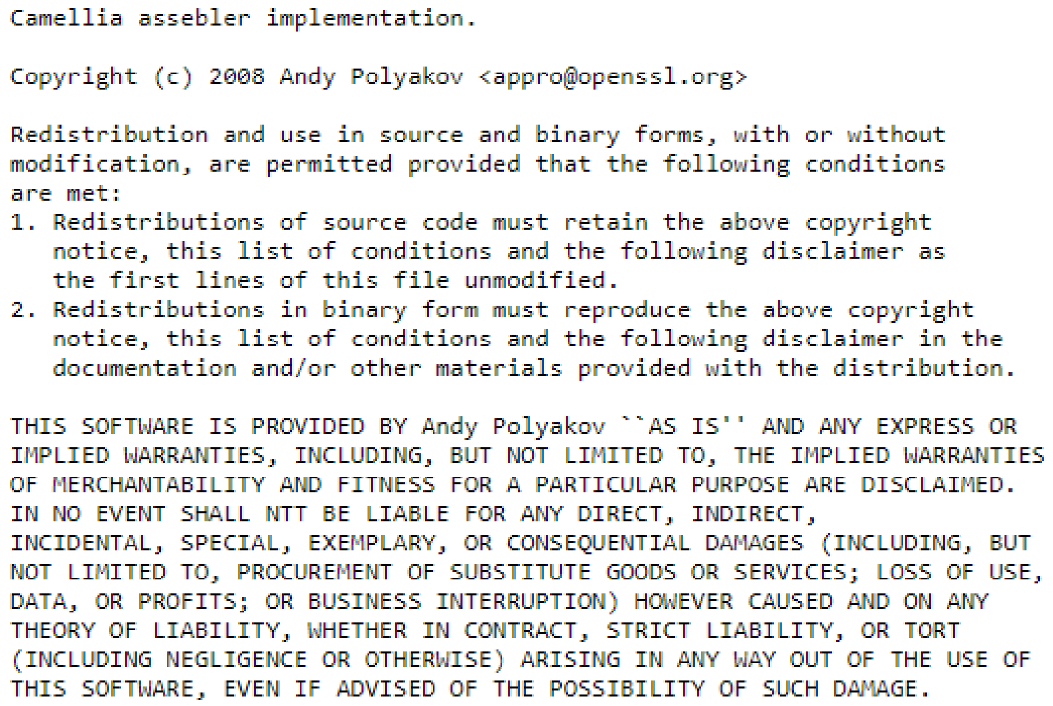
https://www.openssl.org/~appro/camellia/dist/BSD_license.txt



```
Camellia assebler implementation.

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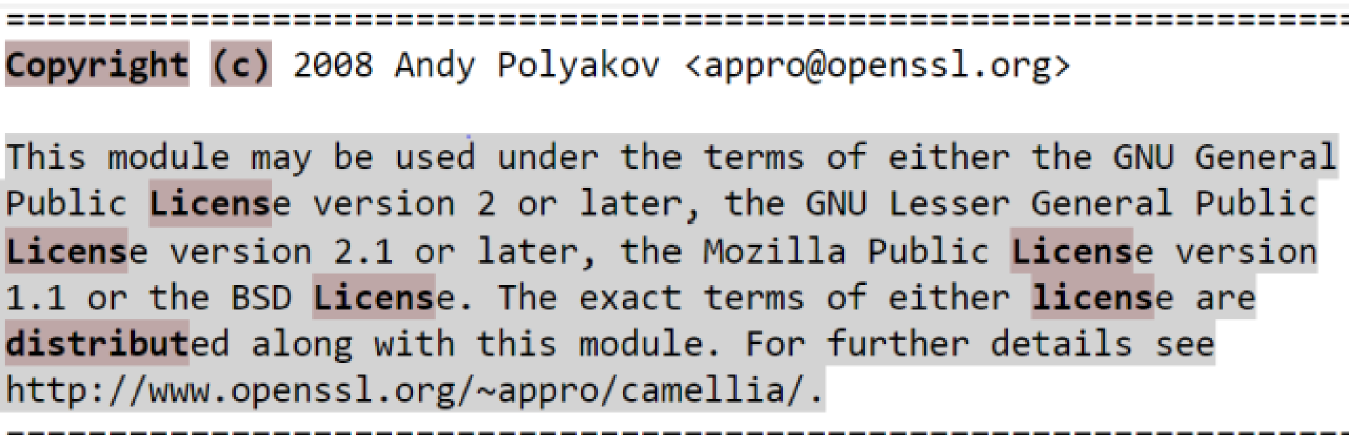

```
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http://www.openssl.org/~appro/camellia/.
--------------------------------------------------------------------
```

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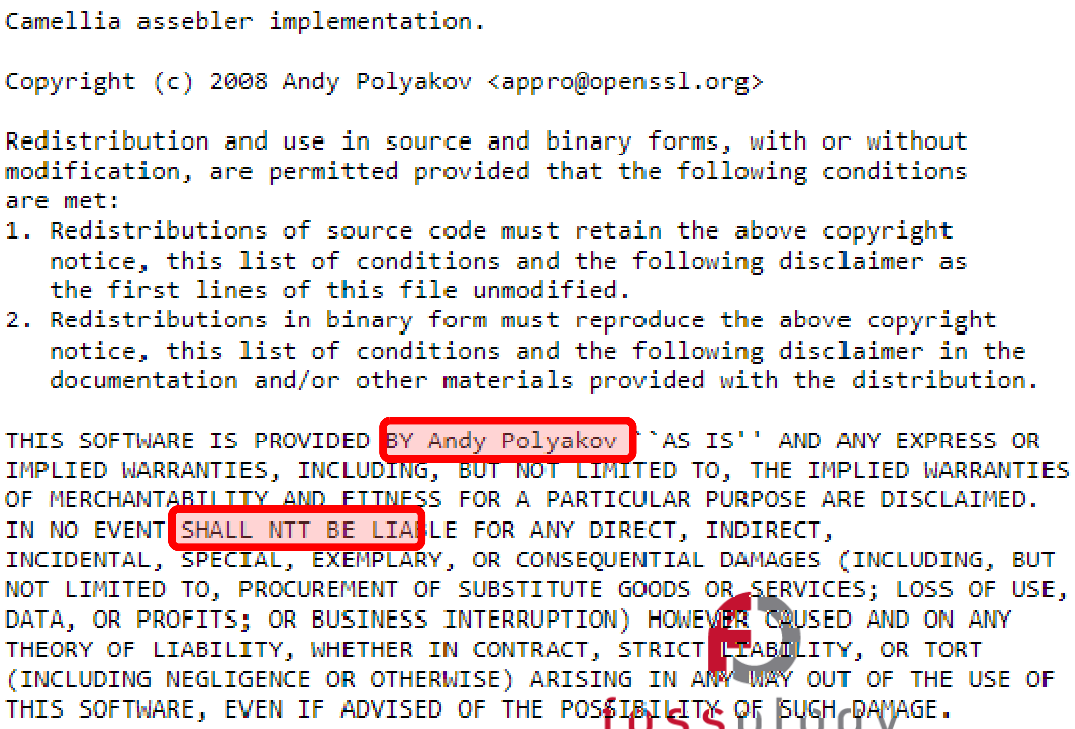

```
Camellia assebler implementation.

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```

Dual licensing expressions

(TrueCrypt 7.1a Source.zip/ Crypto/ AesSmall.h)

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Another real world example:

- How does the organization decide which license to choose
- There may be an external reason for choosing either one or the another

fossology

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Feature: Edit License Conclusions in License Browser

Edit is about a short cut at license review

Use Case

- Within a software component, I know files / folders already.
- I know that files are irrelevant.
  - Unused architecture
  - Test files, code examples
  - Build infrastructure
- **Do I need to look at the files?**

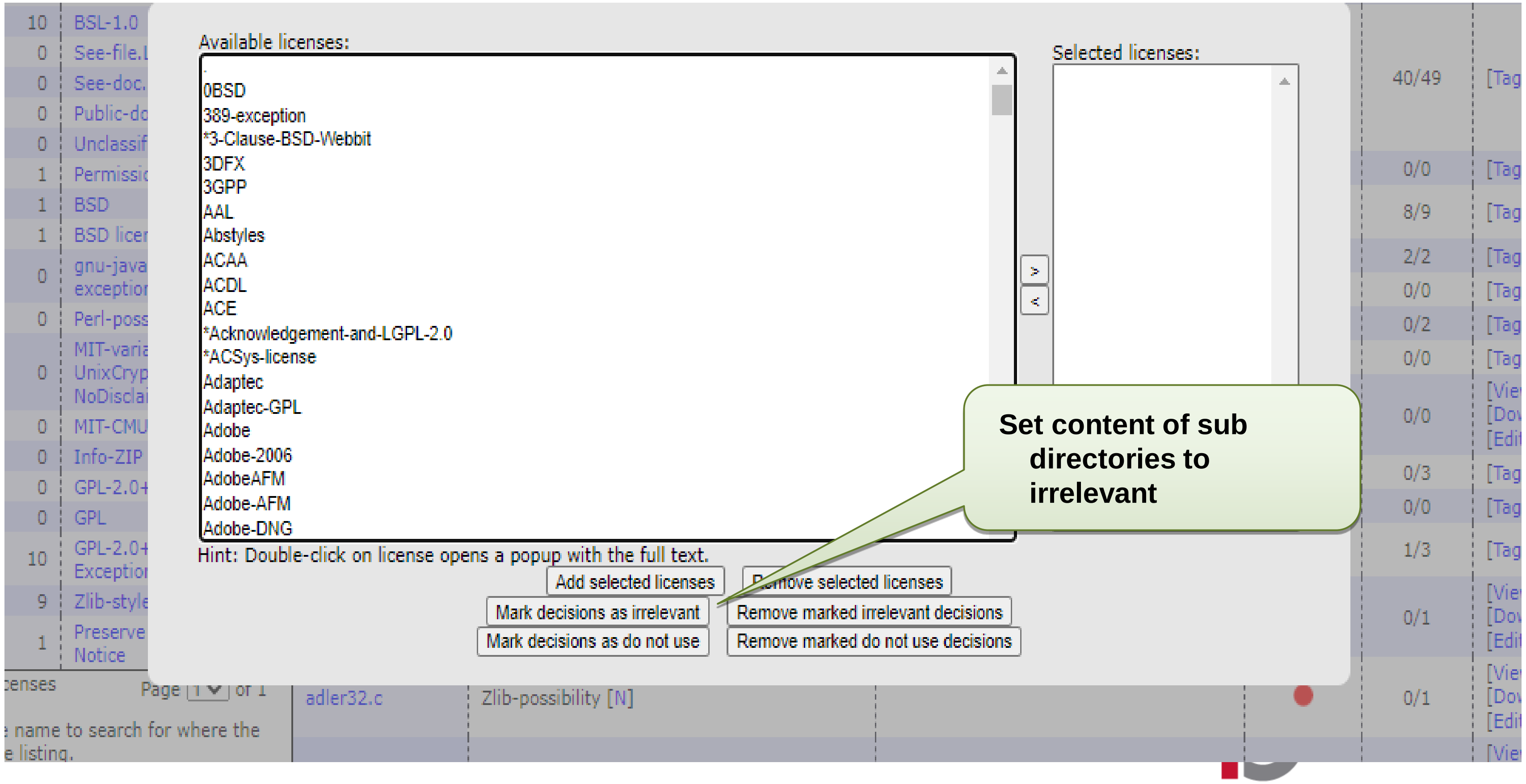
Solution

- FOSSology allow to set / unset license on folder level
- In license browser, the user can set the licenses on folders
  - Set or confirm licenses
  - Remove scan results from the clearing decision
  - Mark files as irrelevant
- What happens actually?
  - The “Edit” creates clearing decisions
  - The scan results are not touched (and preserved)
  - No clearing decision final on scan result conflicts

Feature: Edit License Conclusions in License Browser

User Interface

- At aggregated license browser view select link [Edit]
- Select either licenses for decision …
- … or mark file trees irrelevant (for distribution)



Available licenses:

0BSD
389-exception
*3-Clause-BSD-Webbit
3DFX
3GPP
AAL
Abstyles
ACAA
ACDL
ACE
*Acknowledgement-and-LGPL-2.0
*ACSys-license
Adaptec
Adaptec-GPL
Adobe
Adobe-2006
AdobeAFM
Adobe-AFM
Adobe-DNG

Selected licenses:

Hint: Double-click on license opens a popup with the full text.

Set content of sub directories to irrelevant

Feature: Reviewing Many Files at Once: Bulk Scan

The FOSSology software cannot know all possible license relevant text phrases

Use Case

- Finding standard and known license texts is straightforward
- ***Do I need to create a clearing decision for every file?***
- ***If the scanner yields wrong results, do I need to go into every file and correct then?***

Solution

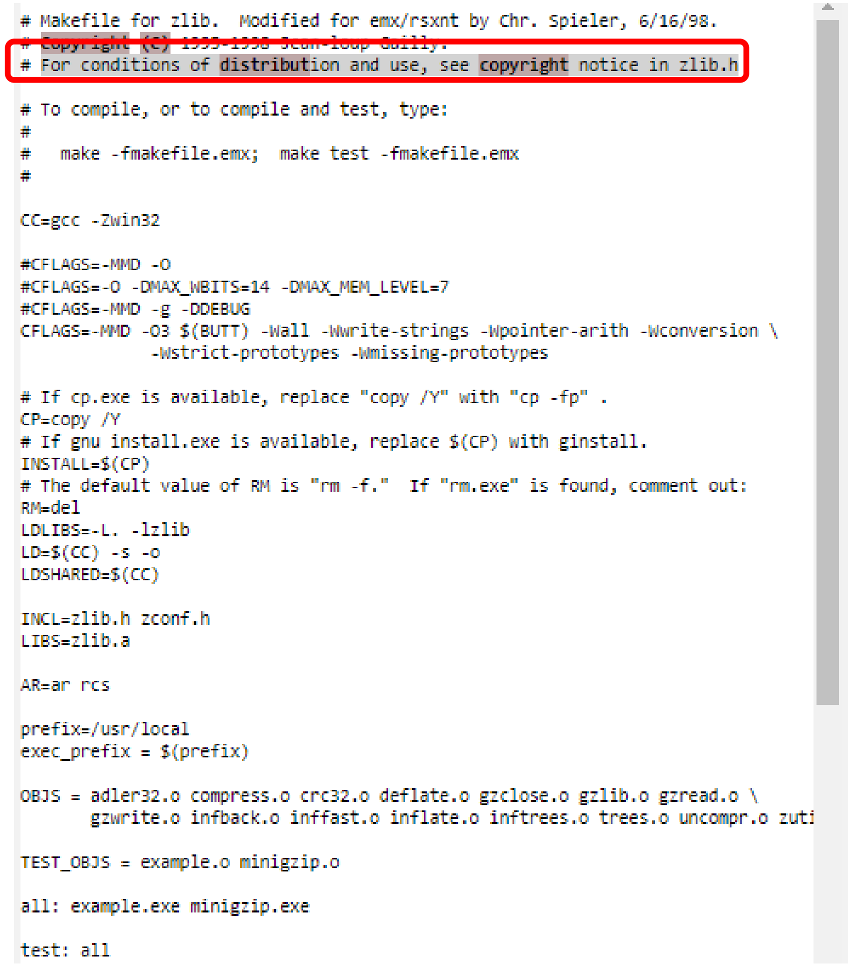
- FOSSology allows the user to define text phases …
  - **For confirmation …**
  - **… or correction**
- And assign license confirmations or corrections to it
  - Every time a file is found with this text phrase (100%) …
  - … the confirmation or correction is applied to it.
- No need to go through every file again.
- Does not apply with scan result conflicts

fossology Open Source Software

Feature: Reviewing Many Files at Once: Bulk Scan

User Interface

- Copy a characteristic text phrase from file view left (1)
- Paste into the bulk scan text field (2)
  - The application will search for file with this text
- Define scanner license findings (3)
  - For correction / removal
  - For confirmation, creating a clearing decision
- Bulk scan will run over all files of the package and apply clearing decisions or scanner corrections where matching (4)



```
# Makefile for zlib.  Modified for emx/rsxnt by Chr. Spieler, 6/16/98.
# Copyright (C) 1995-1998 Jean-loup Gailly.
# For conditions of distribution and use, see copyright notice in zlib.h

# To compile, or to compile and test, type:
#
#   make -fmakefile.emx;  make test -fmakefile.emx
#

CC=gcc -Zwin32

#CFLAGS=-MMD -O
#CFLAGS=-O -DMAX_WBITS=14 -DMAX_MEM_LEVEL=7
#CFLAGS=-MMD -g -DDEBUG
CFLAGS=-MMD -O3 $(BUTT) -Wall -Wwrite-strings -Wpointer-arith -Wconversion \
             -Wstrict-prototypes -Wmissing-prototypes

# If cp.exe is available, replace "copy /Y" with "cp -fp" .
CP=copy /Y
# If gnu install.exe is available, replace $(CP) with ginstall.
INSTALL=$(CP)
# The default value of RM is "rm -f."  If "rm.exe" is found, comment out:
RM=del
LDLIBS=-L. -lzlib
LD=$(CC) -s -o
LDSHARED=$(CC)

INCL=zlib.h zconf.h
LIBS=zlib.a

AR=ar rcs

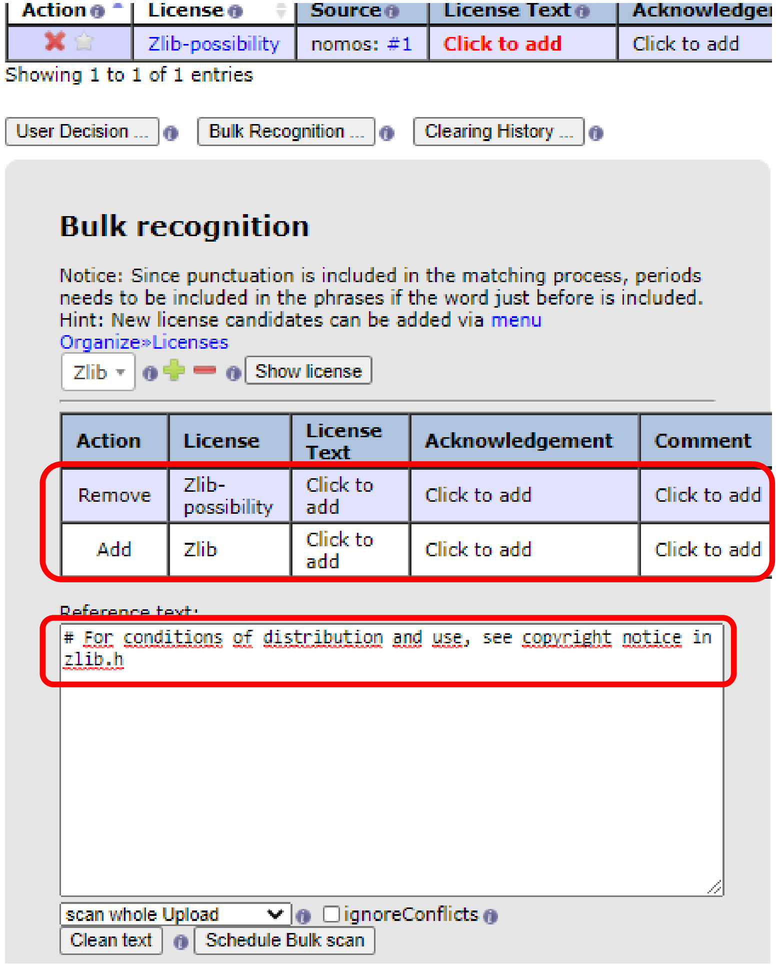
prefix=/usr/local
exec_prefix = $(prefix)

OBJS = adler32.o compress.o crc32.o deflate.o gzclose.o gzlib.o gzread.o \
       gzwrite.o infback.o inffast.o inflate.o inftrees.o trees.o uncompr.o zuti

TEST_OBJS = example.o minigzip.o

all: example.exe minigzip.exe

test: all
```



Action	License	Source	License Text	Acknowledge
✖ ☆	Zlib-possibility	nomos: #1	Click to add	Click to add

Showing 1 to 1 of 1 entries

Bulk recognition

Notice: Since punctuation is included in the matching process, periods needs to be included in the phrases if the word just before is included.
Hint: New license candidates can be added via menu Organize»Licenses

Action	License	License Text	Acknowledgement	Comment
Remove	Zlib-possibility	Click to add	Click to add	Click to add
Add	Zlib	Click to add	Click to add	Click to add

Reference text:

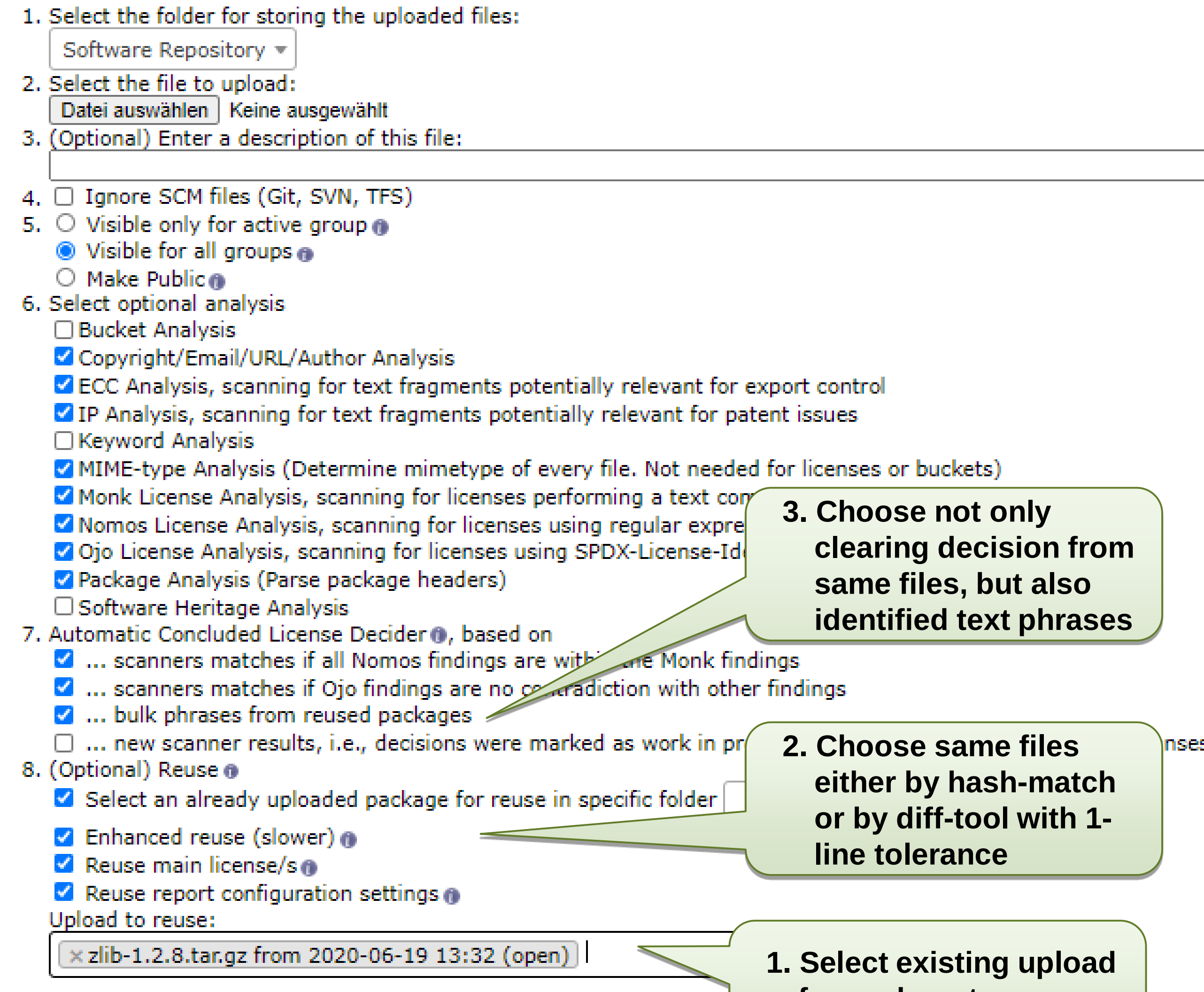
```
# For conditions of distribution and use, see copyright notice in zlib.h
```

scan whole Upload □ ignoreConflicts

Feature: Using Reuse of License Corrections

User Interface

- At upload you can select another existing package on server for reusing license review data
- Three main reuse options given:
  - Reuse license review data at same hash value calculated for files (1)
  - Reuse license review data at one-line tolerance using the diff tool (2)
  - Reuse bulk scan tasks entered for selected existing package also for new package (3)



1. Select the folder for storing the uploaded files:
   Software Repository ▾
2. Select the file to upload:
   Datei auswählen Keine ausgewählt
3. (Optional) Enter a description of this file:
4. □ Ignore SCM files (Git, SVN, TFS)
5. ○ Visible only for active group
   ● Visible for all groups
   ○ Make Public
6. Select optional analysis
   □ Bucket Analysis
   ☑ Copyright/Email/URL/Author Analysis
   ☑ ECC Analysis, scanning for text fragments potentially relevant for export control
   ☑ IP Analysis, scanning for text fragments potentially relevant for patent issues
   □ Keyword Analysis
   ☑ MIME-type Analysis (Determine mimetype of every file. Not needed for licenses or buckets)
   ☑ Monk License Analysis, scanning for licenses performing a text com
   ☑ Nomos License Analysis, scanning for licenses using regular expre
   ☑ Ojo License Analysis, scanning for licenses using SPDX-License-Id
   ☑ Package Analysis (Parse package headers)
   □ Software Heritage Analysis
7. Automatic Concluded License Decider, based on
   ☑ ... scanners matches if all Nomos findings are within the Monk findings
   ☑ ... scanners matches if Ojo findings are no contradiction with other findings
   ☑ ... bulk phrases from reused packages
   □ ... new scanner results, i.e., decisions were marked as work in pr nse
8. (Optional) Reuse
   ☑ Select an already uploaded package for reuse in specific folder
   ☑ Enhanced reuse (slower)
   ☑ Reuse main license/s
   ☑ Reuse report configuration settings
   Upload to reuse:
   × zlib-1.2.8.tar.gz from 2020-06-19 13:32 (open)

3. Choose not only clearing decision from same files, but also identified text phrases

2. Choose same files either by hash-match or by diff-tool with 1-line tolerance

1. Select existing upload from where to reuse license decisions

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Take aways

- License analysis cannot be fully automated – expert knowledge is required
- Think about how to organize your folder structure
- Use edit feature on folder level
- Use bulk scans very extensively
- Consider also to reuse bulk phrases of different uploads
- It is Open Source – no vendor locking and you can adapt it to your needs
- Do not forget to see the fun side

Thank you for your attention

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Internet
https://www.fossology.org

Github
https://github.com/fossology/fossology

fossology
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