What is this about?

You know these examples

- It is about licensing of software packages
- Licensing is expressed in files
- You would like to find licensing statements …
- …and summarize this in SPDX

```xml
<spdx:hasExtractedLicensingInfo>
  <spdx:ExtractedLicensingInfo rdf:about="http://spdx.org/licenses/Apache-1.1">
    <spdx:licenseId>Apache-1.1</spdx:licenseId>
    <spdx:extractedText>
      <![CDATA[
The Apache Software License, Version 1.1
*
* Copyright (c) 2000 The Apache Software Foundation. All rights reserved.
*]]>
    </spdx:extractedText>
  </spdx:ExtractedLicensingInfo>
</spdx:hasExtractedLicensingInfo>
```
Why we are doing this?

You know these examples

Distributing open source software requires to

• Provide licenses of involved software
• Provide copyright statements of involved authors
• Provide disclaimers
• … and much more
It is about finding licenses

Finding Licenses

- License texts
- References to licenses
- Written texts explaining licensing
- License relevant statements
An Example – What do we find?

The Example

- (Apache projects are known for homogenous licensing)
- Such a project declares its licensing on its Website
- However, Open Source implies using other open source
- As such, a projects can contain also parts from other open source projects
Using FOSSology with this Example

Open Source and Reuse

- It is natural that an OSS project reuses available https://github.com/fossology/fossology
- Likely OSS from other projects is found
- For example, FOSSology will find 25 other licensing relevant text occurrences in Apache thrift
Using FOSSology with another Example

Another Example: Linux Kernel

- Looking at the Linux kernel will result in thousands of files containing license relevant information
- Analyzing them yields about 30 distinctive licensing statements
How does FOSSology work?

- Uploading source code archive (*.zip, *.tar.gz, etc)
- Agents scan for license relevant text
  - 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
**What is FOSSology?**

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

### FOSSology Project

[https://www.fossology.org/](https://www.fossology.org/)

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

### FOSSology Development

[https://www.github.com/fossology/fossology](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++
- Besides Web UI:
  - Command line utilities
## Why SPDX in HD?

*SPDX is for sharing metadata*

### What is SPDX?

- SPDX = Software Package Data Exchange
- Defines a format for exchanging metadata about software packages
  - Licensing
  - Copyrights
  - Extension for much more
  - Formats: RDF/XML, Tag-Value and Excel
  - Standardizing license identification
  - SPDX License List

### More Information

- SPDX Homepage [https://spdx.org/](https://spdx.org/)
- SPDX Standard description [https://spdx.org/specifications](https://spdx.org/specifications)
- SPDX License list [https://spdx.org/license-list](https://spdx.org/license-list)
- SPDX Example?
  - You can use FOSSology
What is this about? (Again)

You know these examples

- It is about licensing of software packages
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    <spdx:extractedText><![CDATA[
The Apache Software License, Version 1.1
   *
   * Copyright (c) 2000 The Apache Software Foundation. All rights
   * reserved.
   *
]]>
  </spdx:ExtractedLicensingInfo>
</spdx:hasExtractedLicensingInfo>
```
Why do we call it HD - High Definition?

- **How do you find actually licenses?**
  ... it depends on scanners, text finding implementations.

- **How do you deal with thousands of files and dozens of licenses?**
  ... you will need overview.

- **What if automated scanners cannot determine the licenses?**
  ... not only scanning, but also reviewing.

- **Found a new license text?**
  ... you will need to extract the text.

- **Copyrights with review?**
  ... fishing them out too and eliminate false positives.

- **Dual licensing**
  ... does the scanner find it?
Multiple Scanners for License Relevant Texts

Maturity, Precision, Speed

- FOSSology is a framework for agents
- Three scanners as agents
  - Nomos: Keyword and regular exp
  - Ninka: An sentence-based approach
  - Monk: Text similarity comparison
- Deferent scanners have their strength
- Perform differently for different contexts
  - For standard licenses
  - For finding license relevant statements
Overview gives you control

Handling Large Packages

- Smaller packages (<200 Files) and some licenses are easy to handle
  - Maybe tool support is even not required
- However, thousands of files, many folders and several different licenses are not ideal candidates for manual
  - How to keep overview and focus?
- FOSSology aggregates by two directions
  - Histogram of Licenses to focus on particular licenses
  - Folder hierarchy aggregation allowing
Review Enhances Precision

Scanner cannot determine all

- Some license relevant statements require review
  - References to files
  - New (or unknown) licenses
  - Uncommon statements about licensing
  - Different GPL versions
  - Similar licenses with a twist
- Example:
  - “This software is licensed as described in the file COPYING, which you should have received as part of this distribution. The terms are also available at http://subversion.tigris.org/license-1.html.
  - If newer versions of this license are posted there, you may use a newer version instead, at your option."
Custom License Texts

Licenses not “databased”

- License relevant statements can be
  - References to files
  - New licenses / unknown licenses
  - Uncommon statements about licensing
- Moreover, scanners can be imprecise
  - Different GPL versions
  - Different GPL exceptions
  - Undefined references

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Copyright Statements

Handling Copyrights

- An agent finds copyright relevant statements
- Copyright statement listing in a basic obligation in licenses
  - legal obligation
  - but also fair use
- Bulk edit of copyright statements
- Efficient sorting out of false positives
  - Corrections required with, for example: *Gnomovision version 69, Copyright (C) year name of author*
Dual Licenses

SPDX OR Operator

- Multiple licenses for a file is common
  - One part is different than other part
  - AND-based listing of files
- But multi licensing is different
  - Copyright holder allows user for choosing under which license conditions the usage rights can be exercised
- Changes the situation:
  - GPL-2.0 AND BSD-3-Clause
  - GPL-2.0 OR BSD-3-Clause
FOSSology is Popular

List of Disclosed Users

- See the FOSSology.org website for the most recent list of disclosed users
- Not on this list? – Consider supporting the project with putting your logo there
FOSSology Conclusions

**Most important**

- It is open source software
  - No vendor lock-in, it can be shared among partners
- It supports SPDX
  - Supporting the leading standard for package description
- It has features for detailed and advanced SPDX generation
  - Several features resulting from evolution over years of license clearing

**You like it and would like to contribute?**

- Put your logo on the FOSSology homepage if you use it
- Report issues on Github: [https://github.com/fossology/fossology](https://github.com/fossology/fossology)
- Consider contributing to the code base with your extensions
Thank you for your attention … questions?

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More links https://github.com/fossology/fossology  
https://github.com/sw360/sw360portal