A decorative header consisting of overlapping, semi-transparent geometric shapes in various colors: red, purple, blue, cyan, and green, creating a modern, abstract pattern.

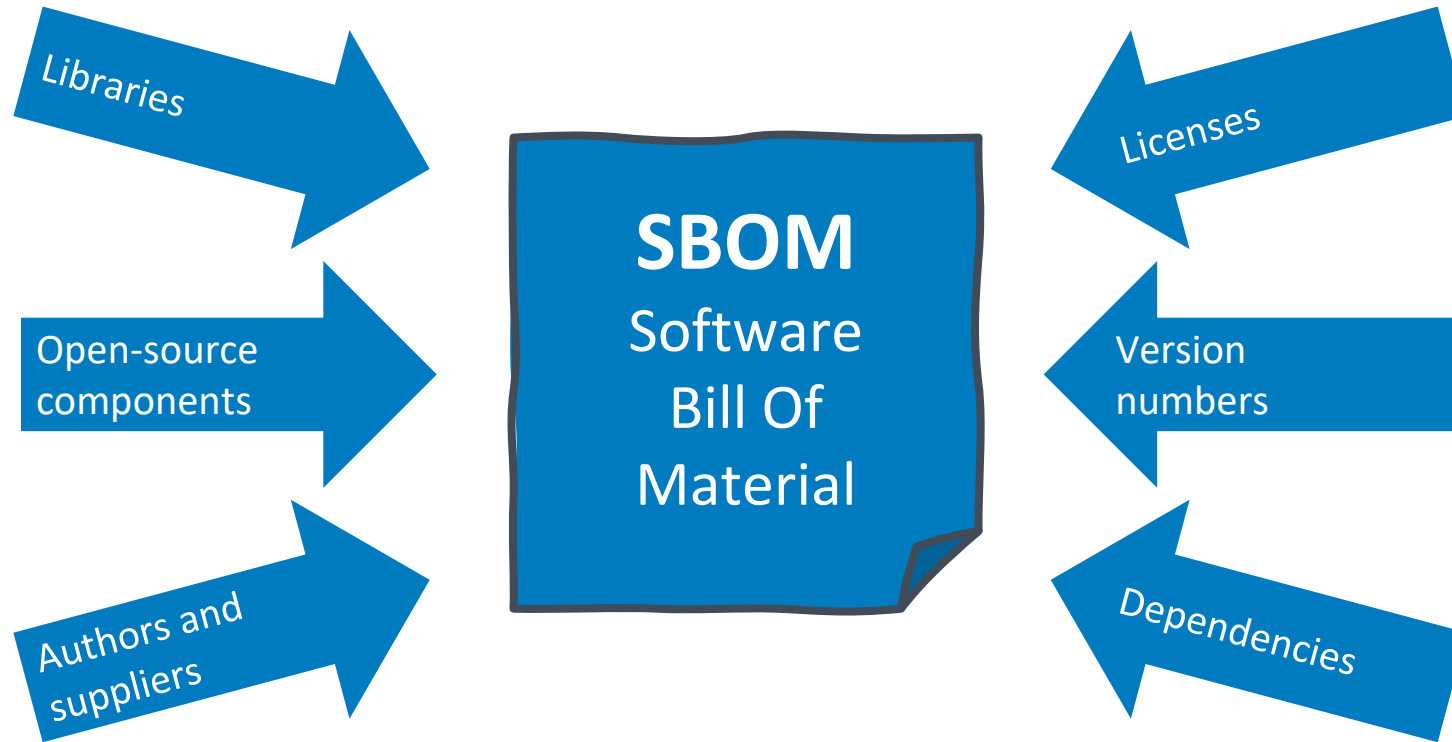
Licensing of ROS Packages: **Changes to package.xml and new tool support**

Christian Henkel, Ralph Lange (Bosch Research)

ROSCon 2023

License Documentation in ROS

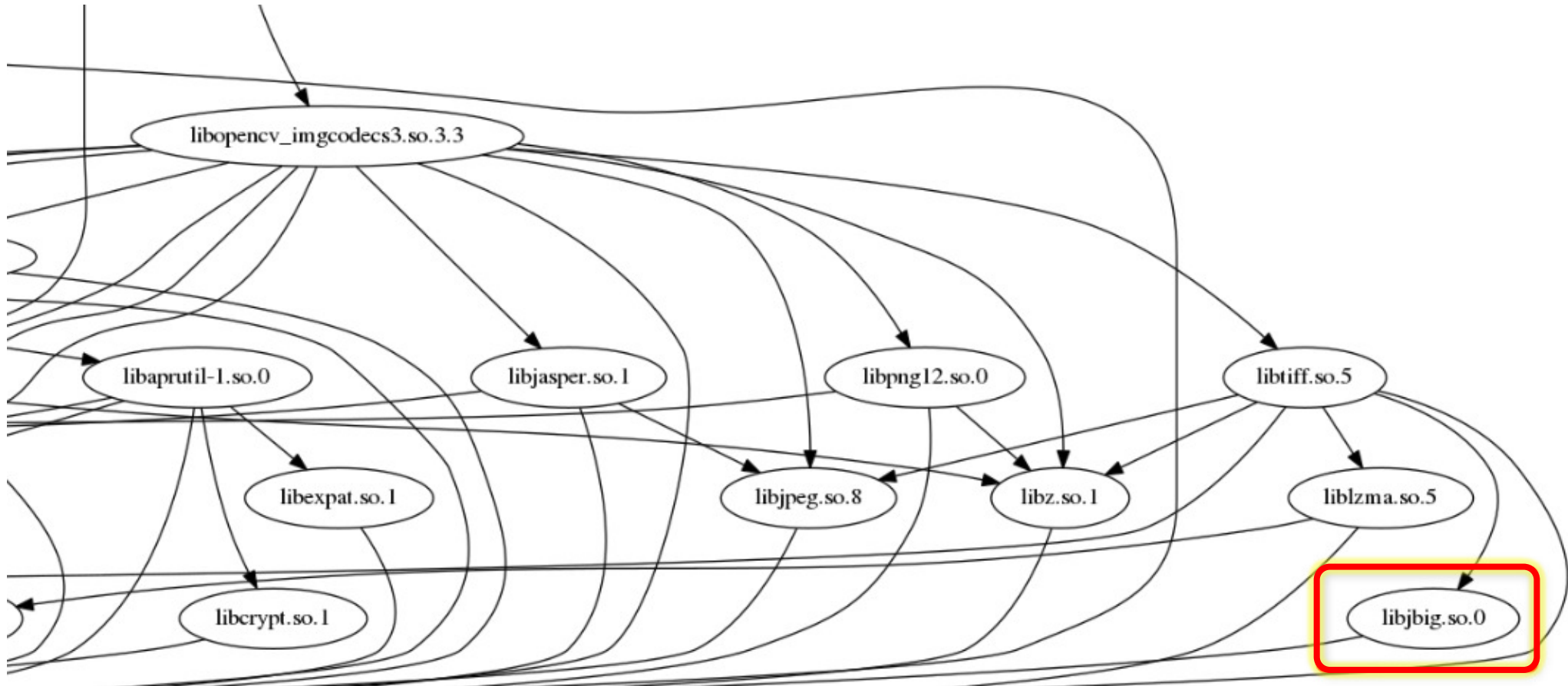
Motivation



Clear documentation of dependencies and licenses is essential for security and legal reasons

License Documentation in ROS

Example 1: OpenCV3 Packages in ROS 1



License Documentation in ROS

Example 2: orocos_kinematics_dynamics (used with tf2)

```
orocos_kinematics_dynamics / orocos_kdl / COPYING 
```

Ruben Smits rename kdl to orocos_kdl

Code Blame 458 lines (386 loc) · 23.8 KB

```
1 GNU LESSER GENERAL PUBLIC LICENSE
2 Version 2.1, February 1999
3
4 Copyright (C) 1991, 1999 Free Software Foundation, Inc.
5 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA
6 Everyone is permitted to copy and distribute verbatim copies
7 of this license document, but changing it is not allowed.
8
```

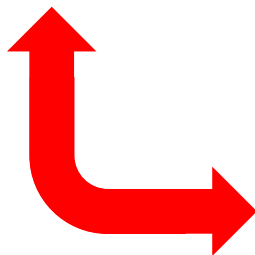
```
orocos_kinematics_dynamics / orocos_kdl / debian / copyright 
```

Ruben Smits rename kdl to orocos_kdl

Code Blame 26 lines (19 loc) · 1.06 KB

```
1 This is kdl, written and maintained by the orocos development team <orocos-d
2 on Wed, 24 Oct 2007 13:20:52 +0200.
3
4 The original source can always be found at:
5 http://www.orocos.org/kdl
6
7 Copyright Holder: OrocOS Dev Team
8
9 License:
10
11 This program is free software; you can redistribute it and/or modify
12 it under the terms of the GNU General Public License as published by
13 the Free Software Foundation; either version 2 of the License, or
14 (at your option) any later version.
```

Inconsistent license specification
Discovered by scanner and fixed in 06/2021



License Documentation in ROS

Copyright files in Debian Packages

```
Format: Bloom subset of https://www.debian.org/doc/packaging-manuals/copyright-format/1.0/  
Upstream-Name: rclcpp
```

```
Files: See file headers in repository for details  
Copyright: See package copyright in source code for details  
License: Apache License 2.0  
See repository for full license text
```

`/usr/share/doc/ros-iron-rclcpp/copyright`

```
Format: https://www.debian.org/doc/packaging-manuals/copyright-format/1.0/  
Source: ftp://ftp.example.com/pub/games  
Upstream-Name: X Solitaire
```

```
Files:  
*
```

```
Copyright: 1998 John Doe <jdoe@example.com>  
1998 Jane Smith <jsmith@example.net>
```

```
License: GPL-2+
```

```
This program is free software; you can redistribute it and/or modify  
it under the terms of the GNU General Public License as published by  
the Free Software Foundation; either version 2 of the License, or  
(at your option) any later version. [...]
```

`debian.org/doc/packaging-manuals/copyright-format/1.0/`

Current copyright files do not meet the **Machine-readable debian/copyright** file format

License Documentation in ROS

REP-149 on license tag in package.xml

<license> (multiple, but at least one)

Name of license for this package, e.g. BSD, GPL, LGPL. In order to assist machine readability, only include the license name in this tag. For multiple licenses multiple separate tags must be used. A package will have multiple licenses if different source files have different licenses. Every license occurring in the source files should have a corresponding `<license>` tag. For any explanatory text about licensing caveats, please use the `<description>` tag.

Most common open-source licenses are described on the [OSI website](#).

Commonly used license strings:

- Apache-2.0
- BSD
- Boost Software License
- GPLv2
- GPLv3
- LGPLv2.1
- LGPLv3
- MIT

Lack of machine readability – packages with license mixes are not properly supported

License Documentation in ROS

Agenda

- Additions to package.xml format (Ralph)
- ROS package license linting (Christian)
- Copyright file generation (Christian)

Additions to package.xml format

License Documentation in ROS

What has been added?

package.xml

Two new attributes according to [ros-infrastructure/rep PR347](#) (accepted by ROS 2 TSC)

```
<package format="2">
  <name>fancy_package</name>
  <version>1.2.3</version>
  <maintainer email="...">John Doe</maintainer>
  ...
  <license file="LICENSE" type="spdx">
    Apache-2.0
  </license>
  <license source-files="3rd-party_math/*">
    BSD-3-Clause
  </license>
</package>
```

Machine-readable debian/copyright file format

```
...
Files:
*
Copyright: 2022-2023 John Doe
License: Apache-2.0

Files:
3rd-party_math/*
Copyright: 2020 Jane Smith
License: BSD-3-Clause
```

Minimal additions – not reinventing the wheel

License Documentation in ROS

The `source-files` attribute

- Optional
- One default case allowed
- For mixed licenses in one package
- Glob format according to Machine-readable debian/copyright file format

```
...  
<license file="LICENSE" type="spdx">  
  Apache-2.0  
</license>  
<license source-files="3rd-party_math/*">  
  BSD-3-Clause  
</license>  
...
```

Given a source file, last matching tag applies

License Documentation in ROS

The **type** attribute

- Optional
- Possible values
 - spdx
 - freeform (default)
- spdx is highly encouraged

```
...  
<license file="LICENSE" type="spdx">  
    Apache-2.0  
</license>  
<license source-files="lib/*" type="freeform">  
    BSD  
</license>  
...
```

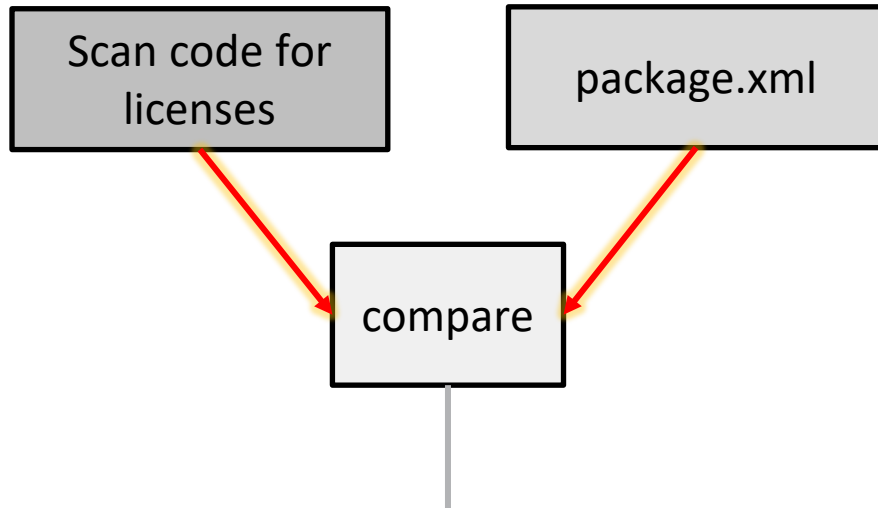
Full name	Identifier
BSD Zero Clause License	0BSD
Attribution Assurance License	AAL
Abstyles License	Abstyles
AdaCore Doc License	AdaCore-doc
Adobe Systems Incorporated Source Code License Agreement	Adobe-2006
Adobe Glyph List License	Adobe-Glyph
Adobe Utopia Font License	Adobe-Utopia
Amazon Digital Services License	ADSL
Academic Free License v1.1	AFL-1.1
Academic Free License v1.2	AFL-1.2
Academic Free License v2.0	AFL-2.0
Academic Free License v2.1	AFL-2.1
Academic Free License v2.0	AFL-2.0

<https://spdx.org/licenses/>

ROS package license linting

License Documentation in ROS

ros_license_toolkit



```
$ ros_license_toolkit -h
usage: ros_license_toolkit [-h] [-v] [-q] path

Checks ROS packages for correct license declaration.

positional arguments:
  path                path to ROS2 package or repo containing packages

optional arguments:
  -h, --help          show this help message and exit
```

Checks

- Is any license defined in package.xml?
- Has at most one license tag without a source-files declaration?
- Do all license tags follow the SPDX standard? (warning)
- Are license texts available and correctly referenced for all declared licenses?
- Does the code contain licenses not declared in the license tags?

License Documentation in ROS

ros_license_toolkit – Sample Output

github.com/boschresearch/ros_license_toolkit

```
[btlib]
git hash of (/home/hec2le/ros/convince_ws/src/bt_tools): de266ba31908a82afacab4192e35ef5abaf18c5b
LicenseTagExistsCheck
  SUCCESS Found licenses ['Apache-2.0']
LicenseTagIsInSpdxListCheck
  SUCCESS All license tags are in SPDX list of licenses.
LicenseTextExistsCheck
  SUCCESS All license tags have a valid license text file.
LicensesInCodeCheck
  SUCCESS All licenses found in the code are covered by a license declaration.
-----
[btlib] Overall:
  SUCCESS
=====
Execution time: 9.74 seconds
All packages:
  SUCCESS
```

License Documentation in ROS

ros_license_toolkit – Details

github.com/boschresearch/ros_license_toolkit

The screenshot shows the GitHub repository page for `ros_license_toolkit`. At the top, it displays the repository name and a warning icon with the text: "Warning: For any legal questions, please consult a lawyer. This tool is not a substitute for legal advice." Below this, there are statistics for the repository: `pytest` passing, `lint` passing, 1 open issue, 2 open pull requests, `pypi` v1.1.5, `python` 99.1%, and `license` Apache 2. The "Motivation" section explains that ROS packages must have licenses and that the tool checks if the license declarations in the `package.xml` match the license(s) of the code, using `scancode-toolkit` to scan the code and compare the results to the declaration in the `package.xml`. The "Functionality" section includes a diagram showing the workflow: "scan code for licenses and copyrights" leads to "compare to package.xml for linting" and "create copyright file for release". The "Features" section is partially visible, starting with "This checks:".

- Available open source
- Contributions are welcome
- Thanks to Felix Mauch (fmauch) for contributing a github action
 - [boschresearch/ros_license_toolkit PR 23](#)
- Now on **pypi**:

The screenshot shows the PyPI page for `ros-license-toolkit` version 1.1.5. It features a search bar at the top with the text "Search projects" and a magnifying glass icon. Below the search bar, the package name "ros-license-toolkit 1.1.5" is displayed in large white text. At the bottom, there is a dark blue button with the text "pip install ros-license-toolkit" and a copy icon.

Copyright file generation

License Documentation in ROS

Generation of Copyright Files

Currently experimental feature at

https://github.com/boschresearch/ros_license_toolkit/tree/add/copyright_generation_demo

Uses information from

- package.xml
- copyright declarations in source files
- license texts

... to generate a copyright file according to the Machine-readable debian/copyright file format

```
Format: https://www.debian.org/doc/packaging-manuals/copyright-format/1.0/
Source: tbd
Upstream-Name: rclcpp

Files:
**
Copyright: 2014 Open Source Robotics Foundation, Inc.
          2014-2020 Open Source Robotics Foundation, Inc.
          2015 Open Source Robotics Foundation, Inc.
          2015-2020 Open Source Robotics Foundation, Inc.
          2016 Open Source Robotics Foundation, Inc.
          2016-2017 Open Source Robotics Foundation, Inc.
          2017 Open Source Robotics Foundation, Inc.
          2018 Open Source Robotics Foundation, Inc.
          2018, Bosch Software Innovations GmbH.
          2019 Intel Corporation
          2019 Nobleo Technology
          2019 Open Source Robotics Foundation, Inc.
          2019-2020 Open Source Robotics Foundation, Inc.
          2020 Amazon.com, Inc. or its affiliates
          2020 Ericsson AB
          2020 Open Source Robotics Foundation, Inc.
          2020, Apex.AI Inc.
          2021 Open Source Robotics Foundation, Inc.
          2021, Apex.AI Inc.
          2022 Open Source Robotics Foundation, Inc.
          2023 Open Source Robotics Foundation, Inc.
          2023 Sony Group Corporation
          2023 iRobot Corporation

License: Apache-2.0

          Apache License
          Version 2.0, January 2004
          http://www.apache.org/licenses/

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

          "License" shall mean the terms and conditions for use, reproduction,
```

License Documentation in ROS

Help Wanted

ROS NEEDS YOU



- I am looking for co-maintainers!
- Contributions are very welcome
 - Integration in ament
 - ... and in bloom
- Please test your package with the license linter and report the results if you are not agreeing with them

Summary

Minimal additions to package.xml format

- **source-files** and **type** attributes
- Use SPDX license identifiers
- github.com/ros-infrastructure/rep → PR 347

ros_license_toolkit

- Binary: pypi.org/project/ros-license-toolkit/
- Source: github.com/boschresearch/ros_license_toolkit

Generation of copyright files

- ... according to Machine-readable debian/copyright file format
- Integration in Bloom in progress – help welcome!
- github.com/ros-infrastructure/bloom/pull/709

Christian Henkel

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Ralph Lange

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