Software Package Data Exchange (SPDX®)

Specification Version: 2.0

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1 Rationale

1.1 Charter

To create a set of data exchange standards that enable companies and organizations to share license and component information (metadata) for software packages and related content with the aim of facilitating license and other policy compliance.

1.2 Definition

The Software Package Data Exchange (SPDX®) specification is a standard format for communicating the components, licenses, and copyrights associated with a software package. An SPDX file is associated with a particular software package and contains information about that package in the SPDX format.

1.3 Why is a common format for data exchange needed?

Companies and organizations (collectively "Organizations") are widely using and reusing open source and other software packages. Compliance with the associated licenses requires a set of analysis activities and due diligence that each Organization performs independently, which may include a manual and/or automated scan of software and identification of associated licenses followed by manual verification. Software development teams across the globe use the same open source packages, but little infrastructure exists to facilitate collaboration on the analysis or share the results of these analysis activities. As a result, many groups are performing the same work leading to duplicated efforts and redundant information. The SPDX working group seeks to create a data exchange format so that information about software packages and related content may be collected and shared in a common format with the goal of saving time and improving data accuracy.

1.4 What does this specification cover?

1.4.1 SPDX Document Creation Information: Meta data to associate analysis results with a specific version of the SPDX file and license for use, and provide information on how, when, and by whom the SPDX file was created.

1.4.2 Package Information: Facts that are common properties of the entire package.

1.4.3 File Information: Facts (e.g. copyrights, licenses) that are specific to each file included in the package.

1.4.4 Other Licensing Information Detected: A way to capture information about and refer to licenses that are not on the SPDX License List .

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Appendix IV: SPDX License Expressions

Overview

Often a single license can be used to represent the licensing terms of a source code or binary file, but there are situations where a single license identifier is not sufficient. A common example is when software is offered under a choice of one or more licenses (e.g., GPL-2.0 OR BSD-3-Clause). Another example is when a set of licenses is needed to represent a binary program constructed by compiling and linking two (or more) different source files each governed by different licenses (e.g., LGPL-2.1 AND BSD-3-Clause).

SPDX License Expressions provides a way for one to construct expressions that more accurately represent the licensing terms typically found in open source software source code. A license expression could simple be a single license identifier found on the SPDX license list; a user defined license reference denoted by the LicenseRef-{idString}; a license identifier combined with a SPDX defined exception; or some combination of license identifiers, license references and exceptions constructed using a small set of defined operators (e.g., AND, OR, WITH and +). We provide the definition of what constitutes a valid an SPDX License Expression in this section.

The exact syntax of license expressions is described below in ABNF.

```
idstring              = 1*(ALPHA / DIGIT / "-" / "." )
license-id            = <short form license identifier in Appendix I.1>
license-exception-id  = <short form license exception identifier in Appendix I.2>
license-ref           = ["DocumentRef-"1*(idstring)":"]"LicenseRef-"1*(idstring)

simple-expression = license-id / license-id"+" / license-ref
compound-expression =  1*(simple-expression /
                simple-expression "WITH" license-exception-id /
                compound-expression "AND" compound-expression /
                compound-expression "OR" compound-expression ) /
                "(" compound-expression ")" )

license-expression =  1*1(simple-expression / compound-expression)
```

In the following sections we describe in more detail **<license-expression>** construct, a licensing expression string that enables a more accurate representation of the licensing terms of modern day software.

A valid **<license-expression>** string consists of either:

(i) a simple license expression, such as a single license identifier; or
(ii) a more complex expression constructed by combining smaller valid expressions using Boolean license operators.

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Simple License Expressions

A simple **<license-expression>** is composed one of the following:

- An **SPDX License List Short Form Identifier**. For example: `GPL-2.0`
- An **SPDX License List Short Form Identifier** with a unary**"+"** operator suffix to represent the current version of the license or any later version. For example: `GPL-2.0+`
- A SPDX user defined license reference: `["DocumentRef-"1*(idstring)":"]"LicenseRef-"1*(idstring)`
  Some examples:
  ```
  LicenseRef-23
  LicenseRef-MIT-Style-1
  DocumentRef-spdx-tool-1.2:LicenseRef-MIT-Style-2
  ```

Composite License Expressions

More expressive composite license expressions can be constructed using **"OR", "AND",** and **"WITH"** operators similar to constructing mathematical expressions using arithmetic operators. For the tag/value format, any license expression that consists of more than one license identifier and/or LicenseRef, should be encapsulated by parentheses: **"( )"**. This has been specified to facilitate expression parsing. Nested parentheses can also be used to specify an order of precedence which is discussed in more detail in subsection (4).

1) Disjunctive "OR" Operator

If presented with a choice between two or more licenses, use the disjunctive binary **"OR"** operator to construct a new lincense expression, where both the left and right operands are valid license expression values.

For example, when given a choice between the LGPL-2.1 or MIT licenses, a valid expression would be:

```
(LGPL-2.1 OR MIT)
```

An example representing a choice between three different licenses would be:

```
(LGPL-2.1 OR MIT OR BSD-3-Clause)
```

2) Conjunctive "AND" Operator

If required to simultaneously comply with two or more licenses, use the conjunctive binary **"AND"** operator to construct a new license expression , where both the left and right operands are a valid license expression values.

For example, when one is required to comply with both the LGPL-2.1 or MIT licenses, a valid expression would be:

```
(LGPL-2.1 AND MIT)
```

An example where all three different licenses apply would be:

```
(LGPL-2.1 AND MIT AND BSD-2-Clause)
```

3) Exception "WITH" Operator

Sometimes a set of license terms apply except under special circumstances. In this case, use the binary **"WITH"** operator to construct a new license expression to represent the special exception situation. A

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valid **<license-expression>** is where the left operand is a **<simple-expression>** value and the right operand is a **<license-exception-id>** that represents the special exception terms.

For example, when the Bison exception is to be applied to GPL-2.0+, the expression would be:

```
(GPL-2.0+ WITH Bison-exception-2.2)
```

The current set of valid exceptions can be found in Appendix I, section 2. For the most up to date set of exceptions please see spdx.org/licenses. If the applicable exception is not found on the SPDX License Exception List, then use a single **<license-ref>** to represent the entire license terms (including the exception).

4) Order of Precedence and Parentheses

The order of application of the operators in an expression matters (similar to mathematical operators). The default operator order of precedence of a **<license-expression>** is:

1. +
2. WITH
3. AND
4. OR

where a lower order operator is applied before a higher order operator.

For example, the following expression: `LGPL-2.1 OR BSD-3-Clause AND MIT` represents a license choice between either `LGPL-2.1` and the expression `BSD-3-Clause AND MIT` because the `AND` operator takes precedence over (is applied before) the `OR` operator.

When required to express an order of precedence that is different from the default order a **<license-expression>** can be encapsulated in pairs of parentheses: **( )**, to indicate that the operators found inside the parentheses takes precedence over operators outside. This is also similar to the use of parentheses in an algebraic expression e.g., (5+7)/2.

For instance, the following expression: `(MIT AND (LGPL-2.1+ OR BSD-3-Clause))` states the `OR` operator should be applied before the `AND` operator. That is, one should first select between the LGPL-2.1+ or the BSD-3-Clause license before applying the MIT license.

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