



Software Package Data eXchange (SPDX™) Specification

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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 including: 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 being created. 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 Analysis Information: Meta data to associate analysis results with a specific version of the SPDX file.

1.4.2 Creator and Reviewer Information: Information about the creation of the SPDX file and information about those who have reviewed it.

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

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

1.4.5 Common Licenses: A list of common licenses likely to be encountered and a standardized naming convention for referring to these licenses within an SPDX document. This naming convention will also be the basis for extending this set of common licenses over time.

1.4.6 Evolution Hooks: A set of mechanisms that permit extending the specification in a structured manner under specific future versions of the specification.

1.5 What is not covered in the specification?

- 1.5.1 Information that cannot be derived from an inspection (whether manual or using automated tools) of the package to be analyzed.
- 1.5.2 How the data stored in and SPDX file is used by the recipient.
- 1.5.3 Any identification of any patent(s) which may or may not relate to the package.
- 1.5.4 Legal interpretation of the licenses or any compliance actions that might need to be taken.

1.6 Format Requirements:

- 1.6.1 Must be in a human readable form.
- 1.6.2 Must be in a syntax that a software tool can read and write.
- 1.6.3 Must be suitable to be checked for syntactic correctness independent of how it was generated (human or tool).
- 1.6.4 The SPDX file character set must support UTF-8 encoding.
- 1.6.5 Must permit automated specification syntax validation.
- 1.6.6 Resource Description Framework (RDF) will be used to represent certain semantic information.
- 1.6.7 Interoperability with a annotate tag format and the RDF format will be preserved.

2 SPDX Document Information

One instance is required for each SPDX document produced. It provides the necessary information for forward and backward compatibility for the processing tools.

Fields:

2.1 SPDX Version

2.1.1 Purpose: Provide a reference number that can be used to understand how to parse and interpret the rest of the file. It will enable both future changes to the specification and to support backward compatibility. The version number consists of a Major and Minor version indicator. The Major field will be incremented when incompatible changes between versions are made (one or more sections are created, modified or deleted). The Minor field will be incremented when backwards compatible changes are made.

2.1.2 Intent: Here, parties exchanging Identification Information in accordance with SPDX specification need to provide 100% transparency as to which SPDX specification such Identification Information is conforming to.

2.1.3 Cardinality: Mandatory, one.

2.1.4 Data Format: SPDX-M.N
where: M is Major version number, N is minor version number.

2.1.5 Tag: SPDXVersion

Example:
SPDXVersion: SPDX-1.0

2.1.6 RDF: spdx:specVersion

Example:
<SpdxDocument rdf:about"<http://www.spdx.org/tools#SPDXANALYSIS>">
 <spdxVersion> SPDX-1.0 </spdxVersion>
</SpdxDocument>

3 Creation Information

One instance of the Creation Information field set is required per package instance.

Fields:

3.1 Creator

3.1.1 Purpose: Identify how the meta data information in the SPDX file was generated. If it was generated manually, it should indicate – who did the analysis. If the analysis was done on behalf of a company, that should be indicated. If the information in the file was generated with a software tool, the file should indicate an identifier and version for that tool. If multiple participants were involved, there should be multiple instances of this field used to indicate the participants.

3.1.2 Intent: Here, the generation method will assist the reader of the Analysis Information in self determining the general reliability/accuracy of the analysis information provided by this file.

3.1.3 Cardinality: Mandatory, one or more.

3.1.4 Data Format: single line of text with the following keywords.
 "Person: person name" and optional "(email)" or
 "Company: company" and optional "(email)" or
 "Tool: tool identifier - version".

3.1.5 Tag: Creator

Example:

Creator: Person: Jane Doe (jane.doe@example.com)
 Creator: Company: ExampleCodeInspect (contact@example.com)
 Creator: Tool: LicenseFind-1.0

3.1.6 RDF: property `spdx:creator` in class `spdx:CreationInfo`

Example:

```
<CreationInfo>
  <creator> Person: Jane Doe (jane.doe@example.com) </creator>
  <creator> Company: ExampleCodeInspect (contact@example.com) </creator>
  <creator> Tool: LicenseFind-1.0 </creator>
</CreationInfo>
```

3.2 Created

3.2.1 Purpose: Identify when the last update to the analysis was done and the SPDX file was originally created. This is to be specified according to combined data and time in UTC format as specified in ISO 8601 standard.

3.2.2 Intent: Here, the Time Stamp can serve as a verification as to whether the analysis needs to be updated.

3.2.3 Cardinality: Mandatory, one.

- 3.2.4 Data Format:** YYYY-MM-DDThh:mm:ssZ
where:
 YYYY is year,
 MM is month with leading zero,
 DD is day with leading zero,
 T is delimiter for time,
 hh is hours with leading zero in 24 hour time,
 mm is minutes with leading zero,
 ss is seconds with leading zero, and
 Z is universal time indicator.
- 3.2.5 Tag:** Created
- Example:**
Created: 2010-01-29T18:30:22Z
- 3.2.6 RDF: property** spdx:created in **class** spdx:CreationInfo
- Example:**
 <CreationInfo>
 <created> 2010-01-29T18:30:22Z </created>
 </CreationInfo>

3.3 Creator Comment

- 3.3.1 Purpose:** An optional field for authors of the SPDX file content to provide general comments to the consumers of the SPDX content.
- 3.3.2 Intent:** Here, the intent is to provide readers/reviewers with comments by the author of the analysis of the SPDX package.
- 3.3.3 Cardinality:** Optional, zero or one.
- 3.3.4 Data Format:** free form text that can span multiple lines. In tag format this is delimited by <text> .. </text>, in RDF, it is delimited by <rdfs:comment>.
- 3.3.5 Tag:** CreatorComment
- Example:**
 CreatorComment: <text>
 This package has been shipped in source and binary form.
 The binaries were created with gcc 4.5.1 and expect to link to compatible system run time libraries.
 </text>
- 3.3.6 RDF: property** rdfs:comment in **class** spdx:CreationInfo
- Example:**
 <CreatorComment>
 <rdfs:comment> This package has been shipped in source and binary form.
 The binaries were created with gcc 4.5.1 and expect to link to compatible system run time libraries. </rdfs:comment>
 </CreatorComment>

4 Package Information

One instance of the Package Information is required per package being analyzed. A package can contain sub-packages, but the overview is a reference to the entire contents of the package listed.

Fields:

4.1 Formal Name

4.1.1 Purpose: Full name of the package as given by originator with version information if available.

4.1.2 Intent: Here, the formal name of each package is an important conventional technical identifier to be maintained for each package.

4.1.3 Cardinality: Mandatory single instance.

4.1.4 DataFormat: single line text string of full name and version information if available.

4.1.5 Tag: PackageName

Example:

PackageName: glibc 2.11.1

4.1.6 RDF: property spdx:name in **class** spdx:Package

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <name>glibc 2.11.1</name>
</Package>
```

4.2 Package File Name

4.2.1 Purpose: Actual file name of package instance.

4.2.2 Intent: Here, the actual file name of the compressed file (containing the package) is a significant technical element that needs to be carried with each package's Identification Information.

4.2.3 Cardinality: Mandatory single instance

4.2.4 Data Format: single line text string of machine generated file name and version typically includes the packaging and compression methods used.

4.2.5 Tag: PackageFileName

Example:

PackageFileName: glibc-2.11.1.tar.gz

4.2.6 RDF: property `spdx:packageFileName` in **class** `spdx:Package`**Example:**

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <packageFileName>glibc 2.11.1</packageFileName>
</Package>
```

4.3 Package Download Location

4.3.1 Purpose: This field identifies the download Universal Resource Locator (URL) for this package at the time that the SPDX file was initially created and the analysis was done. If there is no public URL, then it is explicitly marked as “unknown”.

4.3.2 Intent: Here, where to download the exact package being referenced is a critical verification and tracking datum.

4.3.3 Cardinality: Mandatory, one.

4.3.4 Data Format: uniform resource locator | “UNKNOWN”

4.3.5 Tag: `PackageDownloadLocation`

Example:

`PackageDownloadLocation:` <http://ftp.gnu.org/gnu/glibc/glibc-2.11.2.tar.gz>

4.3.6 RDF: property `spdx:packageDownloadLocation` in **class** `spdx:Package`**Example:**

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <packageDownloadLocation>http://ftp.gnu.org/gnu/glibc/ </packageDownloadLocation>
</Package>
```

4.4 Package Checksum

4.4.1 Purpose: This field provides an independently reproducible mechanism that permits unique identification of a specific package that correlates to the data in this SPDX file. This identifier enables a recipient to determine if any file in the original package has been changed. The SHA-1 algorithm will be used to provide the checksum by default.

4.4.2 Intent: Here, by providing an unique identifier of each package, confusion over which version/modification of a specific package the Identification Information references should be eliminated.

4.4.3 Cardinality: Optional, zero or one.

4.4.4 Algorithm: **SHA1** (<http://tools.ietf.org/html/rfc3174>) is to be used on on the package.

4.4.5 Data Format: There are two components, an algorithm identifier(SHA1), a separator (“.”) and a 160 bit value represented as 40 hexadecimal digits.

4.4.6 Tag: PackageChecksum**Example:**

PackageChecksum: SHA1: d6a770ba38583ed4bb4525bd96e50461655d2758

4.4.7 RDF: properties spx:algorithm, spx:checksumValue in **class** spx:checksum**Example:**

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <Checksum>
    <algorithm> SHA1 </algorithm>
    <checksumValue> d6a770ba38583ed4bb4525bd96e50461655d2758
    </checksumValue>
  </Checksum>
</Package>
```

4.5 Package Verification Code

4.5.1 Purpose: This identifier enables a recipient to determine if any file in the original package that the analysis was done on has been changed, and permits including of an SPDX file as part of a package. This field provides an independently reproducible mechanism that permits unique identification of a specific contents of a package based on the actual files (except the SPDX file itself, if it is included in the package) that make up each package, that correlate to the data in this SPDX file.

4.5.2 Intent: Here, by providing an unique identifier based on the files inside each package, confusion over which version/modification of a specific package the analysis information references should be eliminated, and the SPDX data file can be embedded within the package.

4.5.3 Cardinality: Mandatory, one

4.5.4 Algorithm:

```
verificationcode = 0
filelist = ""
for all files in package {
  if file is an "excludes" file, skip it /* exclude SPDX analysis file itself */
  appended filelist with "SHA1(file) || string(file)"
}
sort filelist in ascending order by SHA1 value
verificationcode = SHA1(filelist)
```

4.5.5 Data Format: single line of text with 160 bit binary represented as 40 hexadecimal digits and optionally "(excludes: full filename)"

4.5.6 Tag: PackageVerificationCode**Example:**

PackageVerificationCode: d6a770ba38583ed4bb4525bd96e50461655d2758 (excludes: ./package.spdx)

4.5.7 RDF: `spdx:packageVerificationCodeValue`, `spdx:packageVerificationCodeExcludedFile` in class `spdx:PackageVerificationCode`

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <PackageVerificationCode>
    <packageVerificationCodeValue>d6a770ba38583ed4bb4525bd96e50461655d2758
    </packageVerificationCodeValue>
    <packageVerificationCodeExcludedFile> ./package.spdx </packageVerificationCodeExcludedFile>
  </PackageVerificationCode>
</Package>
```

4.6 Source Information

4.6.1 Purpose: This is a free form text field that contains additional comments about the origin of the package. For instance, this field might include comments indicating whether the package been pulled from a source code management system or has been repackaged.

4.6.2 Intent: Here, by providing a freeform field, reviewers can provide any additional information to describe any anomalies, or discoveries, in the determination of the origin of the package.

4.6.3 Cardinality: Optional, one

4.6.4 Data Format: single line of free form text

4.6.5 Tag: SourceInfo

Example:

SourceInfo: uses glibc-2_11-branch from git://sourceware.org/git/glibc.git.

4.6.6 RDF: `spdx:sourceInfo`

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <sourceInfo>uses glibc-2_11-branch from git://sourceware.org/git/glibc.git.
</sourceInfo>
</Package>
```

4.7 Declared License

4.7.1 Purpose: This field lists the licenses that have been declared by the creators of the package. The licenses are listed using a standard short form name. See Appendix I for standardized license short forms. If a Declared License is not one of the standardized license short forms, this field must contain a reference to the full license text included in this SPDX file. If no license is declared, the "NONE" keyword should be used. If it is unclear if there is a license reference or not, use "NOASSERTION" keyword. If more than one license is formally declared for package, then each should be listed. If the creators of the package offer the recipient a choice of licenses, then each of the choices will be declared as a "disjunctive" license.

4.7.2 Intent: This is simply the license identified in text in the actual package source code files (typically in the header of each package file.) This field may have multiple declared licenses, if multiple licenses are declared at the package level.

4.7.3 Cardinality: Mandatory, one.

4.7.4 Data Format: <short form identifier in Appendix I> | "LicenseRef"-N | "NONE" | "NOASSERTION" | <license set>

4.7.5 Tag: LicenseDeclared
For a license set, when there is a choice between licenses ("disjunctive license"), they should be separated with a "or" and enclosed in brackets. Similarly when multiple licenses need to be applied ("conjunctive license"), they should be separated with an "and" and enclosed in brackets.

Example:

PackageLicenseDeclared: LGPL-2.0

Example:

PackageLicenseDeclared: (LGPL-2.0 or LicenseRef-3)

4.7.6 RDF: property spdx:licenseDeclared in **class** spdx:Package

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <LicenseDeclared> LGPL-2.0 </LicenseDeclared>
</Package>
```

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  ???
</Package>
```

4.8 Concluded License

4.8.1 Purpose: This field contains the license the reviewer has concluded as governing the package, if it can be determined. The options to populate this field are limited to:

- (a) the SPDX standardized license short form identifier; this should be used when the concluded license is on the SPDX standardized license short list;
- (b) a verbatim copy of the concluded license when the concluded license is not on the SPDX standardized license short list ("non-standard license"), denoted by a LicenseRef-#;
- (c) "NOASSERTION"; this should be used
 - (i) if the reviewer has attempted to but cannot reach a reasonable objective determination of the concluded license, or
 - (ii) if the reviewer is uncomfortable concluding a license, despite some license information being available;
 - (iii) if the reviewer has made no attempt to arrive at a concluded license.
- (d) "NONE" if there is no licensing information present in the package.

If there is more than one concluded license, all should be recited. If the recipient has a choice of multiple licenses, then each of the choices should be recited as a "disjunctive" license. Lastly, if the Conclude License(s) conflicts with the Declared License Information in Package, a written explanation must be provided in the Package Description field below.

4.8.2 Intent: Here, the intent is to have the reviewer analyze the License Information in package, based on objective information, e.g., "COPYING FILE", etc., together with the results from any scanning tools, to arrive at a reasonably objective conclusion as to what license is governing the package.

4.8.3 Cardinality: Mandatory, one

4.8.4 Data Format: <short form identifier in Appendix I> | "LicenseRef"-N | "NOASSERTION" | "NONE" | <license set>

4.8.5 Tag: "LicenseConcluded:"
For a license set, when there is a choice between licenses ("disjunctive license"), they should be separated with a "or" and enclosed in brackets. Similarly when multiple licenses need to be applied ("conjunctive license"), they should be separated with an "and" and enclosed in brackets.

Example:

PackageLicenseConcluded: LGPL-2.0

Example:

PackageLicenseConcluded: (LGPL-2.0 or LicenseRef-3)

4.8.6 RDF: property spdx:licenseConcluded in **class** spdx:Package

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <LicenseConcluded> LGPL-2.0 </LicenseConcluded>
</Package>
```

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  ???
</Package>
```

4.9 All Licenses Information from Files

4.9.1 Purpose: This field is to contain a list of all licenses found in the package by scanning the files, manually or using automated tools. The licenses should use the standard short form names. See Appendix I for standardized license short forms. If a detected license is not one of the standardized license short forms, this field must contain a reference to the full licenses text included in this SPDX file. If no licenses are detected in any of the file, then the "NONE" short form in Appendix I should be used. The relationship between licenses (conjunctive, disjunctive) is not specified in this field – it is simply a listing of all licenses found.

4.9.2 Intent: Here, we intend to capture all licenses within the package seen in the actual files.

4.9.3 Cardinality: Mandatory, one or many.

4.9.4 Data Format: <short form identifier in Appendix I> | "LicenseRef"-N | "NONE"

4.9.5 Tag: LicenseInfoFromFiles

Example:

LicenseInfoFromFiles: GPL-2.0
LicenseInfoFromFiles: LicenseRef-1
LicenseInfoFromFiles: LicenseRef-2

4.9.6 RDF: property `spdx:licenseInfoFromFiles` in class `spdx:Package`**Example:**

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <LicenseInfoFromFiles> GPL-2.0 </LicenseInfoFromFiles>
  <LicenseInfoFromFiles> LicenseRef-1 </LicenseInfoFromFiles>
  <LicenseInfoFromFiles> LicenseRef-2 </LicenseInfoFromFiles>
</Package>
```

4.10 Comments on License

4.10.1 Purpose: This field is a detailed description of the analysis and any relevant background references that went in to arriving at the Concluded License(s) for a package. If the Concluded License(s) does not match the License Information from Files, such rationale must be recited by the reviewer in this field. This field is also where an explanation can be recited if the reviewer placed "NOASSERTION" as the Conclude License(s).

4.10.2 Intent: Here, the intent is to provide the reader with a detailed explanation of how the Concluded License(s) was determined if it does not match the License Information from the files, is marked "NOASSERTION", or other helpful information for the reader relevant to determining the license of the package.

4.10.3 Cardinality: Optional, one

4.10.4 Data Format: free form text that can span multiple lines. In tag format this is delimited by `<text> .. </text>`, in RDF, it is delimited by `<rdfs:comment>`.

4.10.5 Tag: `LicenseComments`

Example:

```
LicenseComments: <text>
One of the statically linked licenses was a GPL-3.0. Due to the viral property of this
license, the entire package must be considered as GPL-3.0.
</text>
```

4.10.6 RDF: property `spdx:licenseComments` in class `spdx:Package`**Example:**

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <licenseComments>
    This package has been shipped in source and binary form.
    The binaries were created with gcc 4.5.1 and expect to link to
    compatible system run time libraries.
  </licenseComments>
</Package>
```

4.11 Copyright Text

4.11.1 Purpose: Identify the copyright holders of the package, as well as any dates present. This will be a free form text field extracted from the package information files. If package level copyright is not clear, then "NOASSERTION" should be used. If there is no copyright information in the package at all, then "NONE" is appropriate.

4.11.2 Intent: Here, by identifying the actual copyright holder(s), some ambiguities, e.g., under which license the copyright holder(s) were intending to license the package, may be resolvable by knowing who to contact for clarity.

4.11.3 Cardinality: Mandatory, one.

4.11.4 Data Format: delimited multiple lines of free form text | "NOASSERTION" | "NONE"

4.11.5 Tag: "PackageCopyrightText:"
In tag format multiple lines are delimited by <text> .. </text>.

Example:

```
PackageCopyrightText: <text>
Copyright 2008-2010 John Smith
</text>
```

4.11.6 RDF: property spdx:copyrightText in **class** spdx:Package

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <copyrightText>
    Copyright 2008-2010 John Smith
  </copyrightText>
</Package>
```

4.12 Summary Description

4.12.1 Purpose: This field is a short description of the package

4.12.2 Intent: Here, the intent is to allow a reader/reviewer of this field to quickly understand the function/use of the package, at a high level, without having to parse the source code of the actual package.

4.12.3 Cardinality: Optional, one.

4.12.4 Data Format: delimited free form text that can span multiple lines.

4.12.5 Tag: Summary
In tag format multiple lines are delimited by <text> .. </text>.

Example:

```
Summary: <text> gnu c library </text>
```

4.12.6 RDF: property spdx:summary in **class** spdx:Package

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <summary> gnu c library </summary>
</Package>
```

4.13 Description

4.13.1 Purpose: This field is a more detailed description of the package, and can be used for any comments on license discrepancies. It may also be extracted from the packages itself.

4.13.2 Intent: Here, the intent is to provide technical readers/reviewers with a detailed technical explanation of the functionality, anticipated use, and anticipated implementation of the package. This field may also include a description of improvements over prior version of the package, where applicable.

4.13.3 Cardinality: Optional, one.

4.13.4 Data Format: delimited free form text than can span multiple lines.

4.13.5 Tag: Description
In tag format multiple lines are delimited by <text> .. </text>.

Example:

Description: <text>
This package provides the gnu c library,
</text>

4.13.6 RDF: property spdx:description in **class** spdx:Package

Example:

```
<Package rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?package">
  <description>
    This package provides the gnu c library, ....
  </description>
</Package>
```

5 Other Licensing Information Detected

This section is used for any detected or declared licenses that are NOT one of the standard licenses. One instance should be created for every unique license or licensing information reference detected in package that does not match one of the standard license short forms from Appendix I. Each license instance should have the following fields.

Fields:

5.1 Identifier Assigned

5.1.1 Purpose: Provide a unique identifier for the packages and files sections to refer to non standard license text detected in the package and reproduced here to aid analysis.

5.1.2 Intent: Here, we seek to identify in whole or in part portions of the package which are licensed under unfamiliar and/or uncommon licenses.

5.1.3 Cardinality: mandatory, one.

5.1.4 Data Format: "LicenseRef-"N where N is a unique ascending numeric value.

5.1.5 Tag: "LicenseID"

Example:

LicenseID: LicenseRef-1

5.1.6 RDF: property spdx:licenseID in **class** spdx:ExtractedLicensingInfo

Example:

```
<ExtractedLicensingInfo rdf:about="...">
  <licenseID> LicenseRef-1 </licenseID>
</ExtractedLicensingInfo>
```

5.2 Extracted Text

5.2.1 Purpose: Provide a copy of the actual text of the license extracted from the package that is associated with the License ID to aid in analysis.

5.2.2 Intent: Here, the actual license text included in the package serves as confirmation that the license, and version, named in the header files of the package is correct.

5.2.3 Cardinality: Mandatory, one.

5.2.4 Data Format: delimited free form text field that may span multiple lines.

5.2.5 Tag: ExtractedText
In tag format multiple lines are delimited by <text> .. </text>.

Example:

ExtractedText: <text>"THE BEER-WARE LICENSE" (Revision 42):
<phk@FreeBSD.ORG> wrote this file. As long as you retain this notice you
can do whatever you want with this stuff. If we meet some day, and you think this stuff

is worth it, you can buy me a beer in return Poul-Henning Kamp
</text>

5.2.6 RDF: property `spdx:extractedText` in class `spdx:ExtractedLicensingInfo`

Example:

```
<ExtractedLicensingInfo rdf:about="...">
  <licenseID> LicenseRef-1 </licenseID>
  <extractedText> "THE BEER-WARE LICENSE" (Revision 42):
    <phk@FreeBSD.ORG> wrote this file. As long as you retain this notice you
    can do whatever you want with this stuff. If we meet some day, and you think
    this stuff is worth it, you can buy me a beer in return Poul-Henning Kamp
  </extractedText>
</ExtractedLicensingInfo>
```

6 File Information

This section is used to list information for the files in the package. Each file in the package should have a set of the following fields.

Fields:

6.1 File Name

6.1.1 Purpose: Identify path to file that corresponds to this information.

6.1.2 Intent: Here, any confusion over where a file needs to hierarchically be placed for proper functionality is mitigated.

6.1.3 Cardinality: Mandatory, one.

6.1.4 Data Format: "relative directory"/"filename.suffix"

6.1.5 Tag: FileName

Example:

FileName: ./package/foo.c

6.1.6 RDF: property spdx:fileName in **class** spdx:File

Example:

```
<File rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?file">
  <fileName>./package/foo.c</fileName>
</File>
```

6.2 File Type

6.2.1 Purpose: This field identifies common types of files where there may be different treatment of copyright and license information: source, binary, machine generated, etc. "SOURCE" should be used when the file is of human readable source code (.c, .html, etc.). "BINARY" should be used, when the file is a compiled object (.o, .a, etc.). "ARCHIVE" should be used when the file contains an archive (.tar, .jar, etc.). "OTHER" should be used for those files that don't fit into the above categories (pictures, audio, data files, etc.)

6.2.2 Intent: Here, this field is basically the "best available" summary of the format field, from a developer perspective.

6.2.3 Cardinality: Optional, one.

6.2.4 Data Format: "SOURCE" | "BINARY" | "ARCHIVE" | "OTHER"

6.2.5 Tag: "FileType:"

Example:

FileType: BINARY

6.2.6 RDF: property `spdx:fileType` in class `spdx:File`**Example:**

```
<File rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?file">
  <fileType>BINARY</fileName>
</File>
```

6.3 File Checksum

6.3.1 Purpose: Provide a unique identifier to match analysis information on specific files between packages.

6.3.2 Intent: Here, by providing an unique identifier of each file, confusion over which version/modification of a specific file the Identification Information references should be eliminated.

6.3.3 Cardinality: Mandatory, one.

6.3.4 Algorithm: SHA1 (<http://tools.ietf.org/html/rfc3174>) is to be used on on the file.

6.3.5 Data Format: There are two components, an algorithm identifier (SHA-1), a separator (":") and a 160 bit value represented as 40 hexadecimal digits.

6.3.6 Tag: FileChecksum

Example:

```
FileChecksum: SHA1: d6a770ba38583ed4bb4525bd96e50461655d2758
```

6.3.7 RDF: property `spdx:Checksum` in class `spdx:File`

Example:

```
<File rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?file">
  <Checksum>
    <algorithm>SHA1</algorithm>
    <checksumValue>d6a770ba38583ed4bb4525bd96e50461655d2758
  </checksumValue>
  </Checksum>
</File>
```

6.4 Concluded License

6.4.1 Purpose: This field contains the license the reviewer has concluded as governing the file, if it can be determined. The options to populate this field are limited to:

- (a) the SPDX standardized license short form identifier; this should be used when the concluded license is on the SPDX standardized license list;
- (b) a verbatim copy of the concluded license when the concluded license is not on the SPDX standardized license list ("other licensing info");
- (c) "NOASSERTION"; this should be used
 - (i) if the reviewer has attempted to but cannot reach a reasonable objective determination of the concluded license, or
 - (ii) if the reviewer is uncomfortable concluding a license, despite some license information being available; or
 - (iii) if the reviewer has made no attempt to arrive at a concluded license.
- (d) "NONE"; if there is no license references present in the file.

With respect to “a” and “b” above, if there is more than one concluded license, all should be recited. If the recipient has a choice of multiple licenses, then each of the choices should be recited as a “disjunctive” license.

With respect to “c”, a written explanation can be provided in the License Comments field.

Lastly, if the Concluded License(s) conflicts with the License Information in File, a written explanation should be provided in the License Comments field below.

6.4.2 Intent: Here, the intent is to have the reviewer analyze the License Information in File and other objective information, e.g., “COPYING FILE”, etc., together with the results from any scanning tools, to arrive at a reasonably objective conclusion as to what license is governing the file.

6.4.3 Cardinality: Mandatory, one.

6.4.4 Data Format: <short form identifier in Appendix I> | “LicenseRef”-N | “NOASSERTION” | “NONE” | <license set>

6.4.5 Tag: LicenseConcluded

For a license set, when there is a choice between licenses (“disjunctive license”), they should be separated with a “or” and enclosed in brackets. Similarly when multiple licenses need to be applied (“conjunctive license”), they should be separated with an “and” and enclosed in brackets.

Example:

LicenseConcluded: LGPL-2.0

Example:

LicenseConcluded: (LGPL-2.0 or LicenseRef-2)

6.4.6 RDF: property spdx:licenseConcluded in **class** spdx:File

Example:

```
<File rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?file">
  <LicenseConcluded> LGPL-2.0 </LicenseConcluded>
</File>
```

Example:

```
<File rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?file">
  ???
</File>
```

6.5 License Information in File

6.5.1 Purpose: This field contains the license information actually recited in the file, if any. Any license information not actually in the file, e.g., "COPYING FILE", etc., should not be reflected in this field. This information is most commonly found in the header of the file, although it may be in other areas of the actual file. The options to populate this field are limited to:

- (a) the SPDX standardized license short form identifier; this should be used when the license is on the SPDX standardized license short list and has no ambiguous or superfluous text;
- (b) a verbatim copy of the license information the file when the license information in the file is not on the SPDX standardized license short list ("non-standard license");
- (c) "NONE"; this should be used if the actual file contains no license information; or
- (d) "NOASSERTION" this should be used if the reviewer has not examined the contents of the actual files.

With respect to "a" and "b" above, if license information for more than one license is recited in the file, all should be reflected in this field. If the license information offers the recipient a choice of licenses, then each of the choices should be recited as a "disjunctive" licenses

6.5.2 Intent: Here, the intent is to provide the reader with the license information actually in the file, as compared to the Concluded License field.

6.5.3 Cardinality: Mandatory, one or many

6.5.4 Data Format: <short form identifier in Appendix I> | "LicenseRef"-N | "NONE" | "NOASSERTION"

6.5.5 Tag: LicenseInfoInFile

Example:

LicenseInfoInFile: GPL-2.0
LicenseInfoInFile: LicenseRef-2

6.5.6 RDF: property `spdx:licenseInfoInFile` in **class** `spdx:File`

Example:

```
<File rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?file">
  <licenseInfoInFile>GPL-2.0</licenseInfoInFile>
  <licenseInfoInFile>LicenseRef-2</licenseInfoInFile>
</File>
```

6.6 Comments on License

6.6.1 Purpose: This field is a detailed description of the analysis and any relevant background references that went in to arriving at the Concluded License(s) for a file. If the Concluded License(s) does not match the License Information in File, such rationale must be recited by the reviewer in this field. This field is also where an explanation should be recited if the reviewer placed "NOASSERTION" as the Conclude License(s).

6.6.2 Intent: Here, the intent is to provide the reader with a detailed explanation of how the Concluded License(s) was determined if it does not match the License Information in File, is marked "NOASSERTION", or other helpful information for the reader relevant to determining the license of the file.

6.6.3 Cardinality: Optional, one

6.6.4 Data Format: delimited free form text that can span multiple lines

- 6.6.5 Tag:** LicenseComments
In tag format multiple lines are delimited by <text> .. </text>.

Example:

```
LicenseComments: <text>
The concluded license was taken from the package level that the file was included in.
This information was found in the COPYING.txt file in the xyz directory.
</text>
```

- 6.6.6 RDF: property** spdx:licenseComments in **class** spdx:File

Example:

```
<File:about="http://www.spdx.org/tools#SPDXANALYSIS?file">
  <licenseComments>
    The concluded license was taken from the package level that the file
    was included in. This information was found in the COPYING.txt file
    in the xyz directory. This package has been shipped in source and binary form.
  </licenseComments>
</File>
```

6.7 Copyright Text

- 6.7.1 Purpose:** This field identifies the copyright holders and associated dates of their copyright that are in this specific file if known. Note: Copyright holder identifier may have developer names, companies, email addresses, and may be specified in international character sets. This will be a freeform text field extracted from the package information files. If copyright text cannot be found in the file itself, then "NONE" should be used.

- 6.7.2 Intent:** Here, by identifying the copyright holder(s), the copyright holder(s) may be contacted if licensing issues exist with the package, or to request distribution under another license more compatible with a given implementation, for example.

- 6.7.3 Cardinality:** Mandatory, one.

- 6.7.4 Data Format:** delimited free form text that can span multiple lines | "NONE"

- 6.7.5 Tag:** FileCopyrightText
In tag format multiple lines are delimited by <text> .. </text>.

Example:

```
FileCopyrightText: <text> Copyright 2008-2010 John Smith </text>
```

- 6.7.6 RDF: property** spdx:copyrightText in **class** spdx:File

Example:

```
<File rdf:about="http://www.spdx.org/tools#SPDXANALYSIS?file">
  <copyrightText>
    Copyright 2008-2010 John Smith
  </copyrightText>
</File>
```

6.8 Artifact of Project Name

- 6.8.1 Purpose:** To indicate that a file has been derived from a specific project.
- 6.8.2 Intent:** To make it easier for consumers of the report to determine the original source of the file.
- 6.8.3 Cardinality:** Optional, single instance
- 6.8.4 Data Format:** single free form line of text
- 6.8.5 Tag:** "ArtifactOfProjectName"
Example:
ArtifactOfProjectName: gcc 4.5.2
- 6.8.6 RDF:** property spdx:artifactOf/doap:Project/doap:name
Example:
???

6.9 Artifact of Project Homepage

- 6.9.1 Purpose:** To indicate that a file has been derived from a specific project.
- 6.9.2 Intent:** To make it easier for consumers of the report to determine the original source of the file.
- 6.9.3 Cardinality:** Optional, one.
- 6.9.4 Data Format:** uniform resource locator | "UNKNOWN"
- 6.9.5 Tag:** "ArtifactOfProjectHomePage:"
Example:
ArtifactOfProjectHomePage: UNKNOWN
- 6.9.6 RDF:** spdx:artifactOf/doap:Project/doap:homepage
Example:
???

6.10 Artifact of Project Uniform Resource Identifier

- 6.10.1 Purpose:** To provide a linkage to the project resource in the doap document and permit interoperability between the different formats supported.
- 6.10.2 Intent:** To make it easier for consumers of the report to determine the original source of the file.
- 6.10.3 Cardinality:** Optional, one.
- 6.10.4 Data Format:** URI specifier
- 6.10.5 Tag:** "ArtifactOfProjectURI:"

Example:
ArtifactOfProjectURI: http://... ???

6.10.6 **RDF:** spdx:artifactOf/doap

Example:
???

7 Review Information

Review information can optionally be added after the initial package has been created. The presence of this information is optional, and many separate instances can be added at different times.

Fields:

7.1 Reviewer

7.1.1 Purpose: Record of a person who has reviewed the SPDX file and the date of that review. Note that there is no requirement for a particular reviewer to add their name to the file, however it may be important for participants in the software supply chain to validate whether upstream providers have reviewed the SPDX file. This can be considered as an equivalent to “signed off” or “reviewed by”. Additional reviewers can be added after the original version of the SPDX file is created and can occur as an append to the original file.

7.1.2 Intent: Here, as time progresses certain reviewers will begin to gain credibility as reliable. This field intends to make such information transparent.

7.1.3 Cardinality: Mandatory, one.

7.1.4 Data Format: "Person: person name" and optionally " (email)"

7.1.5 Tag: Reviewer

Example:

Reviewer: Person: Jane Doe (jane@example.com)

7.1.6 RDF: property spdx:reviewer in **class** spdx:Review

Example:

```
<Review>
  <reviewer> Person: Jane Doe (jane@example.com) </reviewer>
</Review>
```

7.2 Review Date

7.2.1 Purpose: Identify when the review was done. This is to be specified according to combined data and time in UTC format as specified in ISO 8601 standard.

7.2.2 Intent: Here, the Review Date can serve as a verification as to when the actual review was done.

7.2.3 Cardinality: Mandatory, one.

7.2.4 Data Format: YYYY-MM-DDThh:mm:ssZ
where:

YYYY is year,
MM is month with leading zero,
DD is day with leading zero,
T is delimiter for time,

hh is hours with leading zero in 24 hour time,
mm is minutes with leading zero,
ss is seconds with leading zero, and
Z is universal time indicator.

7.2.5 Tag: "ReviewDate:"

Example:

ReviewDate: 2010-01-29T18:30:22Z

7.2.6 RDF: property spdx:reviewDate in **class** spdx:Review

Example:

```
<Review>
  <reviewDate> 2010-01-29T18:30:22Z </reviewDate>
</Review>
```

7.3 Review Comment

7.3.1 Purpose: This optional free form multiline text field permits the reviewer to provide commentary on the analysis.

7.3.2 Intent: This allows the reviewer to provide independent assessment and note any points where there is disagreement with the analysis.

7.3.3 Cardinality: Optional, zero or one.

7.3.4 Data Format: delimited free form text that can span multiple lines.

7.3.5 Tag: ReviewComment
 In tag format multiple lines are delimited by <text> .. </text>.

Example:

ReviewComment: <text>

All of the license seen in the file, are matching what was seen during manual expectation. There are some terms that can influence the concluded license, and some alternatives may be possible, but the concluded license is one of the options.
 </text>

7.3.6 RDF: property spdx:comment in **class** spdx:Review

Example:

```
<Review>
  <reviewComment>
    All of the license seen in the file, are matching what was seen during manual
    expectation. There are some terms that can influence the concluded license,
    and some alternatives may be possible, but the concluded license is one of the
    options.
  </reviewComment>
</Review>
```

Appendix I. Standard License Short Forms

The following table contains the licenses with standardized short forms that should be recognized by programs that comply to this version of the specification. The short forms have been derived from common usage identifiers, followed by the version number when known. The identifier and version should be separated by a “-”.

Additional license may be added after this version of the specification. For the most up to date list, please see <http://spdx.org/licenses/>.

Exact match, of the formal license is expected unless indicated otherwise by the template specifications in the version on the SPDX.org web site.

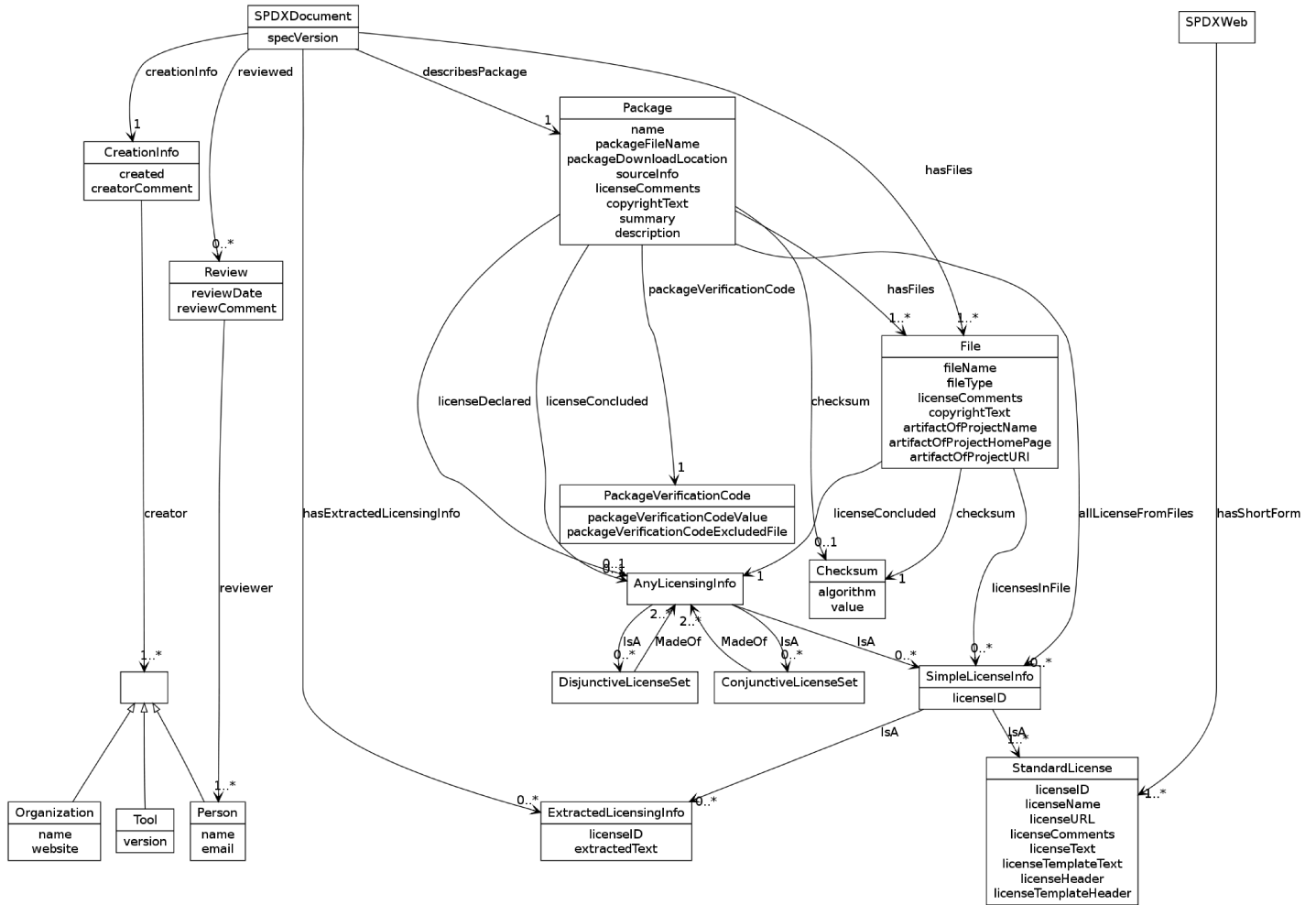
License Identifier	Full name of License
AFL-1.1	Academic Free License v1.1
AFL-1.2	Academic Free License v1.2
AFL-2.0	Academic Free License v2.0
AFL-2.1	Academic Free License v2.1
AFL-3.0	Academic Free License v3.0
APL-1.0	Adaptive Public License
Apache-1.0	Apache License 1.0
Apache-1.1	Apache License 1.1
Apache-2.0	Apache License 2.0
APSL-1.0	Apple Public Source License 1.0
APSL-1.1	Apple Public Source License 1.1
APSL-1.2	Apple Public Source License 1.2
APSL-2.0	Apple Public Source License 2.0
Artistic-1.0	Artistic License 1.0
Artistic-2.0	Artistic License 2.0
AAL	Attribution Assurance License
BSL-1.0	Boost Software License 1.0
BSD-2-Clause	BSD 2-clause "Simplified" or "FreeBSD" License
BSD-3-Clause	BSD 3-clause "New" or "Revised" License
BSD-4-Clause	BSD 4-clause "Original" or "Old" License
CECILL-1.0	CeCILL Free Software License Agreement v1.0
CECILL-2.0	CeCILL Free Software License Agreement v2.0
CECILL-B	CeCILL-B Free Software License Agreement
CECILL-C	CeCILL-C Free Software License Agreement
ClArtistic	Clarified Artistic License
CDDL-1.0	Common Development and Distribution License 1.0
CPAL-1.0	Common Public Attribution License 1.0
CPL-1.0	Common Public License 1.0
CATOSL-1.1	Computer Associates Trusted Open Source License 1.1
CC-BY-1.0	Creative Commons Attribution 1.0
CC-BY-2.0	Creative Commons Attribution 2.0

CC-BY-2.5	Creative Commons Attribution 2.5
CC-BY-3.0	Creative Commons Attribution 3.0
CC-BY-ND-1.0	Creative Commons Attribution No Derivatives 1.0
CC-BY-ND-2.0	Creative Commons Attribution No Derivatives 2.0
CC-BY-ND-2.5	Creative Commons Attribution No Derivatives 2.5
CC-BY-ND-3.0	Creative Commons Attribution No Derivatives 3.0
CC-BY-NC-1.0	Creative Commons Attribution Non Commercial 1.0
CC-BY-NC-2.0	Creative Commons Attribution Non Commercial 2.0
CC-BY-NC-2.5	Creative Commons Attribution Non Commercial 2.5
CC-BY-NC-3.0	Creative Commons Attribution Non Commercial 3.0
CC-BY-NC-ND-1.0	Creative Commons Attribution Non Commercial No Derivatives 1.0
CC-BY-NC-ND-2.0	Creative Commons Attribution Non Commercial No Derivatives 2.0
CC-BY-NC-ND-2.5	Creative Commons Attribution Non Commercial No Derivatives 2.5
CC-BY-NC-ND-3.0	Creative Commons Attribution Non Commercial No Derivatives 3.0
CC-BY-NC-SA-1.0	Creative Commons Attribution Non Commercial Share Alike 1.0
CC-BY-NC-SA-2.0	Creative Commons Attribution Non Commercial Share Alike 2.0
CC-BY-NC-SA-2.5	Creative Commons Attribution Non Commercial Share Alike 2.5
CC-BY-NC-SA-3.0	Creative Commons Attribution Non Commercial Share Alike 3.0
CC-BY-SA-1.0	Creative Commons Attribution Share Alike 1.0
CC-BY-SA-2.0	Creative Commons Attribution Share Alike 2.0
CC-BY-SA-2.5	Creative Commons Attribution Share Alike 2.5
CC-BY-SA-3.0	Creative Commons Attribution Share Alike 3.0
CUA-OPL-1.0	CUA Office Public License v1.0
EPL-1.0	Eclipse Public License 1.0
eCos-2.0	eCos license version 2.0
ECL-1.0	Educational Community License v1.0
ECL-2.0	Educational Community License v2.0
EFL-1.0	Eiffel Forum License v1.0
EFL-2.0	Eiffel Forum License v2.0
Entessa	Entessa Public License
ErlPL-1.1	Erlang Public License v1.1
EUDatagrid	EU DataGrid Software License
EUPL-1.0	European Union Public License 1.0
EUPL-1.1	European Union Public License 1.1
Fair	Fair License
Framework-1.0	Framework Open License 1.0
AGPL-3.0	GNU Affero General Public License v3
GFDL-1.2	GNU Free Documentation License v1.1
GFDL-1.2	GNU Free Documentation License v1.2
GFDL-1.3	GNU Free Documentation License v1.3
GPL-1.0	GNU General Public License v1.0 only
GPL-1.0+	GNU General Public License v1.0 or later
GPL-2.0	GNU General Public License v2.0 only
GPL-2.0+	GNU General Public License v2.0 or later
GPL-2.0-with-autoconf-exception	GNU General Public License v2.0 w/Autoconf exception

GPL-2-with-bison-exception	GNU General Public License v2.0 w/Bison exception
GPL-2.0-with-classpath-exception	GNU General Public License v2.0 w/Classpath exception
GPL-2.0-with-GCC-exception	GNU General Public License v2.0 w/GCC Runtime Library exception
GPL-2.0-with-font-exception	GNU General Public License v2.0 w/Font exception
GPL-3.0	GNU General Public License v3.0 only
GPL-3.0+	GNU General Public License v3.0 or later
GPL-3.0-with-autoconf-exception	GNU General Public License v3.0 w/Autoconf exception
GPL-3.0-with-GCC-exception	GNU General Public License v3.0 w/GCC Runtime Library exception
LGPL-2.1	GNU Lesser General Public License v2.1 only
LGPL-2.1+	GNU Lesser General Public License v2.1 or later
LGPL-3.0	GNU Lesser General Public License v3.0 only
LGPL-3.0+	GNU Lesser General Public License v3.0 or later
LGPL-2.0	GNU Library General Public License v2 only
LGPL-2.0+	GNU Library General Public License v2 or later
gSOAP-1.3b	gSOAP Public License v1.b
HPND	Historic Permission Notice and Disclaimer
IPL-1.0	IBM Public License v1.0
IPA	IPA Font License
ISC	ISC License (Bind, DHCP Server)
LPPL-1.0	LaTeX Project Public License v1.0
LPPL-1.1	LaTeX Project Public License v1.1
LPPL-1.2	LaTeX Project Public License v1.2
LPPL-1.3c	LaTeX Project Public License v1.3c
libpng	libpng License
LPL-1.02	Lucent Public License v1.02 (Plan9)
MS-PL	Microsoft Public License
MS-RL	Microsoft Reciprocal License
MirOS	MirOS Licence
MIT	MIT license (also X11)
Motosoto	Motosoto License
MPL-1.0	Mozilla Public License 1.0
MPL-1.1	Mozilla Public License 1.1
Multics	Multics License
NASA-1.3	NASA Open Source Agreement 1.3
Nauman	Naumen Public License
NGPL	Nethack General Public License
Nokia	Nokia Open Source License
NPOSL-3.0	Non-Profit Open Software License 3.0
NTP	NTP License
OCLC-2.0	OCLC Research Public License 2.0
OGTSL	Open Group Test Suite License
OSL-1.0	Open Software License 1.0
OSL-2.0	Open Software License 2.0
OSL-3.0	Open Software License 3.0
OLDAP-2.8	OpenLDAP Public License v2.8

OpenSSL	OpenSSL License
PHP-3.0	PHP License v3.0
PostgreSQL	PostgreSQL License
Python-2.0	Python Software Foundation License v2
QPL-1.0	Q Public License 1.0
RPSL-1.0	RealNetworks Public Source License v1.0
RPL-1.5	Reciprocal Public License 1.5
RHeCos-1.1	Red Hat eCos Public License v1.1
RSCPL	Ricoh Source Code Public License
Ruby	Ruby License
OFL-1.1	SIL Open Font License 1.1
Simple-2.0	Simple Public License 2.0
Sleepycat	Sleepycat License
SugarCRM-1.1.3	SugarCRM Public License v1.1.3
SPL	Sun Public License
Watcom-1.0	Sybase Open Watcom Public License 1.0
NCSA	University of Illinois/NCSA Open Source License
VSL-1.0	Vovida Software License v1.0
W3C	W3C Software and Notice License
WXwindows	wxWindows Library License
Xnet	X.Net License
XFree86-1.1	XFree86 License 1.1
YPL-1.1	Yahoo! Public License v1.1
Zimbra-1.3	Zimbra Public License v1.3
Zlib	zlib License
ZPL-1.1	Zope Public License 1.1
ZPL-2.0	Zope Public License 2.0
ZPL-2.1	Zope Public License 2.1

Appendix II. RDF Data Model Implementation



8 RDF Vocabulary

Version:

2011-05-03-DRAFT

Latest Version:

<http://spdx.org/rdf/terms>

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8.1 Abstract

This vocabulary specification describes the SPDX language, defined as a dictionary of named properties and classes using W3C's RDF Technology.

SPDX is designed to allow the exchange of data about software package. This information includes both lists of files contained in the package and the licensing information related to the contained files or the package as a whole.

The prefix `spdx` prefix used in this document expands to `http://spdx.org/rdf/terms#`.

Other vocabularies used by this one are: [DOAP](#)

Classes

- [SpdxDocument](#)
- [Package](#)
- [Checksum](#)
- [PackageVerificationCode](#)
- [CreationInfo](#)
- [Review](#)
- [File](#)
- [License](#)
- [ExtractedLicensingInfo](#)
- [ConjunctiveLicenseSet](#)
- [DisjunctiveLicenseSet](#)
- [AnyLicenseInfo](#)
- [SimpleLicenseInfo](#)

Class: SpdxDocument

Each `SpdxDocument` represents the results of a provenance, ownership and licensing analysis of exactly one software package. This is, effectively, the top level of SPDX information.

Status:

testing

Properties:

- [specVersion](#)
Cardinality: Mandatory, one
- [creationInfo](#)
Cardinality: Mandatory, one
- [reviewed](#)
Cardinality: Optional, zero or more.
- [describesPackage](#)
Cardinality: Mandatory, one
- [hasFile](#)
Cardinality: Mandatory, one or more
- [hasExtractedLicensingInfo](#)
Cardinality: Optional, zero or more

Class: Package

Each Package represents a piece software that is delivered as a single unit.

Status:

testing

Properties:

- [name](#)
Cardinality: Mandatory, one
- [summary](#)
Cardinality: Optional, zero or one
- [description](#)
Cardinality: Optional, zero or one
- [packageFileName](#)
Cardinality: Mandatory, one
- [downloadLocation](#)
Cardinality: Mandatory, one
- [checksum](#)
Cardinality: Optional, zero or one
- [packageVerificationCode](#)
Cardinality: Mandatory, one

- [sourceInfo](#)
Cardinality: Optional, zero or one
- [copyrightText](#)
Cardinality: Mandatory, one
- [licenseComments](#)
Cardinality: Optional, zero or one
- [licenseDeclared](#)
Cardinality: Mandatory, one
- [licenseConcluded](#)
Cardinality: Mandatory, one
- [licenseInfoFromFiles](#)
Cardinality: Mandatory, one or more
- [hasFile](#)
Cardinality: Mandatory, one or more

Class: File

Each File represents a sequence of octets that is contained in a software package.

Status:

testing

Properties:

- [fileName](#)
Cardinality: Mandatory, one
- [fileType](#)
Cardinality: Optional, zero or one
- [copyrightText](#)
Cardinality: Mandatory, one
- [licenseComments](#)
Cardinality: Optional, zero or one
- [licenseConcluded](#)
Cardinality: Mandatory, one
- [licenseInfoInFile](#)
Cardinality: Mandatory, one or more

- [checksum](#)
Cardinality: Mandatory, one
- [artifactOf](#)
Cardinality: Optional, zero or one
- [missing: references to name & homepage](#)

Class: License

Each License represents a software license. This class is used by the SPDX license repository to represent standard license.

Status:

testing

Properties:

- [licenseId](#)
Cardinality: Mandatory, one
- [licenseText](#)
Cardinality: Mandatory, one

Class: Checksum

Each Checksum is a digest of a file. This digest is produced using a cryptographic hash algorithm which allows the contents of a file to be verified.

Status:

testing

Properties:

- [algorithm](#)
Cardinality: Mandatory, one
- [checksumValue](#)
Cardinality: Mandatory, one

Class: PackageVerificationCode

The PackageVerificationCode is a digest of the package which allows the the package contents to be verified when the SPDX file is embedded in the package [as well as when it is generated external to the package](#). This digest is produced using a cryptographic hash algorithm applied to a manifest of the package.

Status:

testing

Properties:

- [packageVerificationCodeExcludedFile](#)
Cardinality: Optional, **one**
- [packageVerificationCodeValue](#)
Cardinality: Mandatory, one

Class: CreationInfo

Each CreationInfo provides information about an individual, organization or tool that was involved in the creation of this [SpdxDocument](#).

Status:

testing

Properties:

- [creator](#)
Cardinality: Mandatory, one or more
- [created](#)
Cardinality: Mandatory, one
- [rdfs:comment](#)
Cardinality: Optional, zero or one

Class: Review

Each Review represents a signoff by an individual on the information in the [SpdxDocument](#).

Status:

testing

Properties:

- [reviewer](#)
Cardinality: Mandatory, one
- [reviewDate](#)
Cardinality: Mandatory, one
- [rdfs:comment](#)
Cardinality: Optional, zero or one

Class: **ExtractedLicensingInfo**

Each **ExtractedLicensingInfo** represents a license or licensing notice that was found in the package. Any license text that is recognized as a license may be represented as a [License](#) rather than and **ExtractedLicensingInfo**.

Status:

testing

Properties:

- [licenseId](#)
Cardinality: Mandatory, one
- [extractedText](#)
Cardinality: Mandatory, one

Class: **ConjunctiveLicenseSet**

Each **ConjunctiveLicenseSet** represents set of [licenses](#), or other licensing information, all of which apply.

Refines [rdfs:Container](#).

Status:

testing

Properties:

- [member](#)
Cardinality: Mandatory, **two** or more.

Class: **DisjunctiveLicenseSet**

Each **DisjunctiveLicenseSet** represents set of [licenses](#), or other licensing information, only one of which apply.

Refines [rdfs:Container](#).

Status:

testing

Properties:

- [member](#)
Cardinality: Mandatory, **two** or more.

Class: **AnyLicenseInfo**

The **AnyLicenseInfo** class includes all resources that represent licensing information.

Status:

testing

Members

All resources in any of the following classes:

- [SimpleLicenseInfo](#)
- [ConjunctiveLicenseSet](#)
- [DisjunctiveLicenseSet](#)

Class: SimpleLicenseInfo

The SimpleLicenseInfo class includes all resources that represent simple, atomic, licensing information.

Status:

testing

Members

All resources in any of the following classes:

- [License](#)
- [ExtractedLicensingInfo](#)

Properties

- [algorithm](#)
- [artifactOf](#)
- [checksum](#)
- [checksumValue](#)
- [copyrightText](#)
- [created](#)
- [creationInfo](#)
- [creator](#)
- [describesPackage](#)
- [description](#)
- [downloadLocation](#)
- [extractedText](#)
- [fileName](#)
- [fileType](#)
- [hasExtractedLicensingInfo](#)
- [hasFile](#)
- [licenseComments](#)
- [licenseConcluded](#)
- [licenseDeclared](#)
- [licenseId](#)
- [licenseText](#)
- [licenseInfoFromFiles](#)
- [licenseInfoInFile](#)
- [member](#)

- [name](#)
- [packageFileName](#)
- [packageVerificationCode](#)
- [packageVerificationCodeExcludedFile](#)
- [packageVerificationCodeValue](#)
- [reviewDate](#)
- [reviewed](#)
- [reviewer](#)
- [sourceInfo](#)
- [specVersion](#)
- [summary](#)

Property: algorithm

Identifies the algorithm used to produce the subject [checksum](#).

Currently, [SHA-1](#) is the only supported algorithm. It is anticipated that other algorithms will be supported at a later time.

Status:

testing

Domain:

[Checksum](#)

Range:

[spdx:checksumAlgorithm_sha1](#)

Property: artifactOf

Indicates the project in which the file originated. Currently in SPDX, the only supported doap:Project resources are doap:name and doap:homepage properties. The doap:Project URI must be publicly dereferenceable.

Status:

testing

Domain:

[File](#)

Range:

[doap:Project](#)

Property: checksum

The checksum property provides a digest of a File or Package. This allows consumers of the SPDX document to verify that the content of the files or package has not changed.

Status:
testing
Domain:
Any of:
• [Package](#)
• [File](#)
Range:
[Checksum](#)

Property: checksumValue

The checksumValue property provides a hex encoded digest value produced using a specific algorithm.

Status:
testing
Domain:
[Checksum](#)
Range:
[xsd:hexBinary](#)

Property: created

The date and time at which the [SpdxDocument](#) was created. This value must in UTC and have 'Z' as its timezone indicator.

Status:
testing
Domain:
[CreationInfo](#)
Range:
[xsd:dateTime](#)

Property: copyrightText

The text of copyright declarations discovered in the [package](#) or [file](#).

Status:
testing
Domain:
Any of:
• [Package](#)
• [File](#)
Range:
Any of:

- [rdfs:Literal](#)
- [spdx:none](#)
- [spdx:noassertion](#)

Property: creationInfo

The creationInfo property relates an SpdxDocument to a set of information about the creation of the SpdxDocument.

Status:

testing

Domain:

[SpdxDocument](#)

Range:

[CreationInfo](#)

Property: creator

The name and, optionally, contact information of a person, organization or tool that created, or was used to create, the [SpdxDocument](#).

Status:

testing

Domain:

[CreationInfo](#)

Range:

[xsd:string](#)

Property: describesPackage

The describesPackage property relates an SpdxDocument to the package which it describes.

Status:

testing

Domain:

[SpdxDocument](#)

Range:

[Package](#)

Property: description

Provides a detailed description of the [package](#).

Status:
testing
Domain:
[Package](#)
Range:
[xsd:string](#)

Property: downloadLocation

The URI at which this package is available for download. Private (ie, not publicly reachable) URIs are acceptable as values of this property.

The values <http://spdx.org/rdf/terms#none> and <http://spdx.org/rdf/terms#noassertion> may be used to specify that the package is not downloadable or that no attempt was made to determine its download location, respectively.

Status:
testing
Domain:
[Package](#)
Range:
[xsd:anyURI](#)

Property: extractedText

Verbatim license or licensing notice text that was discovered.

Status:
testing
Domain:
[ExtractedLicensingInfo](#)
Range:
[xsd:string](#)

Property: fileName

The name of the file relative to the root of the package.

Status:
testing
Domain:
[File](#)
Range:
[xsd:string](#)

Property: fileType

The type of the file.

Status:

testing

Domain:

[File](#)

Range:

One of:

- [spdx:fileType_source](#)

Indicates the file is a source code file.

- [spdx:fileType_archive](#)

Indicates the file is an archive file.

- [spdx:fileType_binary](#)

Indicates the file is not a text file. `filetype_archive` is preferred for archive files even though they are binary.

- [spdx:fileType_other](#)

Indicates the file did not fall into any of the other categories.

Property: hasExtractedLicensingInfo

Indicates that a particular [ExtractedLicensingInfo](#) was defined in the subject [SpdxDocument](#).

Status:

testing

Domain:

[SpdxDocument](#)

Range:

[ExtractedLicensingInfo](#)

Property: hasFile

Indicates that a particular [file](#) belongs to a [package](#).

Status:

testing

Domain:

[Package](#)

Range:

[File](#)

Property: licenseComments

The licenseComments property allows the preparer of the SPDX document to describe why the licensing in [spdx:licenseConcluded](#) was chosen.

Status:

testing

Domain:

Any of:

- [Package](#)
- [File](#)

Range:

[xsd:string](#)

Property: licenseConcluded

The licensing that the preparer of this SPDX document has concluded, based on the evidence, actually applies to the package.

Status:

testing

Domain:

Any of:

- [Package](#)
- [File](#)

Range:

Any of:

- [AnyLicenseInfo](#)
- [spdx:none](#)
- [spdx:noassertion](#)

Property: licenseDeclared

The licensing that is declared by the authors of the package.

Status:

testing

Domain:

[Package](#)

Range:

Any of:

- [AnyLicenseInfo](#)
- [spdx:none](#)
- [spdx:noassertion](#)

Property: licenseId

A short name for the license that is at least 3 characters long and made up of the characters from the set 'a'-z', 'A'-Z', '0'-9', '+', '_', '.', and '-'. Formally, all `licenseId` values must match the regular expression: `[-+_ .a-zA-Z0-9]{3,}`

Status:

testing

Domain:

- [License](#)
- [ExtractedLicensingInfo](#)

Range:

[xsd:string](#)

Property: licenseText

The full text of the license.

Status:

testing

Domain:

[License](#)

Range:

[xsd:string](#)

Property: licenseInfoFromFiles

Licensing information that was discovered directly in the package. This is effectively a union of the [licenseInfoFromFile](#) properties of all the files contained in the package.

Status:

testing

Domain:

[Package](#)

Range:

Any of:

- [SimpleLicenseInfo](#)

- [spdx:none](#)
- [spdx:noassertion](#)

Property: licenseInfoInFile

Licensing information that was discovered directly in the subject [File](#).

Status:

testing

Domain:

[File](#)

Range:

Any of:

- [SimpleLicenseInfo](#)
- [spdx:none](#)
- [spdx:noassertion](#)

Property: member

A [license](#), or other licensing information, that is a member of the subject license set.

Status:

testing

Domain:

Any of:

- [ConjunctiveLicenseSet](#)
- [DisjunctiveLicenseSet](#)

Range:

[AnyLicenseInfo](#)

Refines:

[rdfs:member](#)

Property: name

The full name of the package including version information.

Status:

testing

Domain:

[Package](#)

Range:

[xsd:string](#)

Property: packageFileName

The base name of the package file name. For example, `zlib-1.2.5.tar.gz`.

Status:

testing

Domain:

[Package](#)

Range:

[xsd:string](#)

Property: packageVerificationCode

A manifest based digest (the algorithm is defined in section [\[link goes here\]](#)) of the package. This allows consumers of this dataset to determine if a package they have in hand is identical to the package from which the data was produced. This algorithm works even if the SPDX document is included in the package. This algorithm is described in detail in the SPDX spec.

Status:

testing

Domain:

[Package](#)

Range:

[PackageVerificationCode](#)

Property: packageVerificationCodeExcludedFile

A file that was excluded when calculating the package verification code.

Status:

testing

Domain:

[PackageVerificationCode](#)

Range:

[xsd:string](#)

Property: packageVerificationCodeValue

The actual package verification code as a hex encoded value.

Status:

testing

Domain:

[PackageVerificationCode](#)

Range:

[xsd:hexBinary](#)

Property: reviewDate

The date and time at which the [SpdxDocument](#) was reviewed. This value must be in UTC and have 'Z' as its timezone indicator.

Status:

testing

Domain:

[Review](#)

Range:

[xsd:dateTime](#)

Property: reviewed

The review property relates a SpdxDocument to the review history.

Status:

testing

Domain:

[SpdxDocument](#)

Range:

[Review](#)

Property: reviewer

The name and, optionally, contact information of the person who performed the review.

Status:

testing

Domain:

[Review](#)

Range:

[xsd:string](#)

Property: sourceInfo

Allows the producer(s) of the SPDX document to describe how the package was acquired and/or changed from

the original source.

Status:
testing
Domain:
[Package](#)
Range:
[xsd:string](#)

Property: specVersion

Identifies the version of this specification that was used to produce this SPDX document. Currently the only supported value is `SPDX-1.0`.

Status:
testing
Domain:
[SpdxDocument](#)
Range:
[xsd:string](#)

Property: summary

Provides a short description of the [package](#).

Status:
testing
Domain:
[Package](#)
Range:
[xsd:string](#)

8.2 Individuals

- [checksumAlgorithm_sha1](#)
- [fileType_archive](#)
- [fileType_binary](#)
- [fileType_other](#)
- [fileType_source](#)
- [none](#)
- [noassertion](#)

Individual: checksumAlgorithm_sha1

Indicates the algorithm used was [SHA-1](#)

Status:
testing

Individual: fileType_archive

Indicates the file is a archive file.

Status:
testing

Individual: fileType_binary

Indicates the file is not a text file. [spx:filetype_archive](#) is preferred for archive files even though they are binary.

Status:
testing

Individual: fileType_other

Indicates the file is not a [source](#), [archive](#) or [binary](#) file.

Status:
testing

Individual: fileType_source

Indicates the file is a source code file.

Status:
testing

Individual: none

When this value is used as the object of a property it indicates that the preparer of the [SpxDocument](#) believes that there is no value for the property. This value should only be used if there is sufficient evidence to support this contention.

Status:
testing

Individual: noassertion

Indicates that the preparer of the SPDX document is not making any assertion regarding the value of this field.

Status:

testing

Appendix III. Grammar

The lex/yacc grammar for parsing the tag value representation is to be added here.

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