SPDX: Bridging the Compliance Tooling Gap

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The Journey to Open Source Compliance

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- A Trail Map for Compliance
- How tools can fit in
- The tools landscape
- A common language to enable tools integrations

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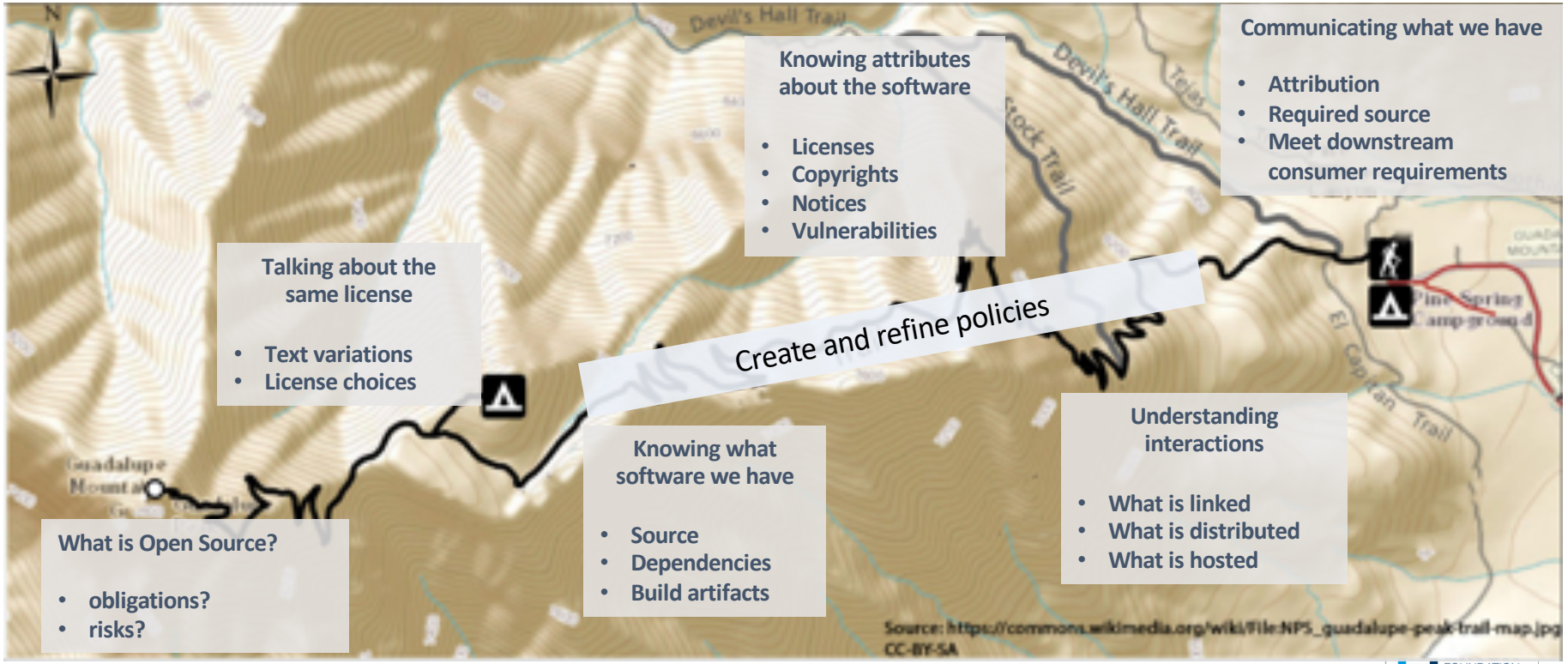
Compliance Trail Map



How Tools Fit In

Challenge	Tools
Talking about the same license	License compare tools, license matching tools, scanners
Knowing what software we have	Dependency tools and plugins, scanners, security analysis tools, source snippet matching tools, binary analysis tools
Knowing attributes about the software	Scanners, binary analysis tools, vulnerability analysis tools
Understanding interactions	Build analysis tools, software interaction analysis tools, some scanners
Communicating what we have	Spreadsheets, PDFs, web apps, plain text

Tooling Landscape (apologies for everything we're missing!)

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License Info

diff

SPDX-License-Identifier

Analysis Tools

binaryanalysis-ng (BANG)

grep

ScanCode

licensee

licensechecker (lc)

Tooling Frameworks

Automating Compliance Tooling (ACT)

Eclipse Oscano

Proprietary Tools

Tooling Landscape (apologies for everything we're missing!)

Best Practices and Initiatives

Sharing-creates-value

OPENCHAIN

TODO

CORE INFRASTRUCTURE INITIATIVE BEST PRACTICES

Information Sources

ClearlyDefined

Software Heritage

More Landscapes!

DoubleOpen survey

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Why not One Tool to Rule Them All?

The Need for an Interchange Standard

- We will have multiple tools
- We will have multiple frameworks for how the tools fit together
- We will have multiple organizational policies, processes and best practices for what “compliance” means
- The information exchanged is very similar
- We need a vocabulary of common terms the tools can use to communicate

SPDX is a **vocabulary** and a **language**

It is not a tool (though the SPDX project provides some tools)

It is not a framework

It is not a policy or a process

It is a human-readable, machine-readable way to get tools, frameworks, policies and processes to fit together

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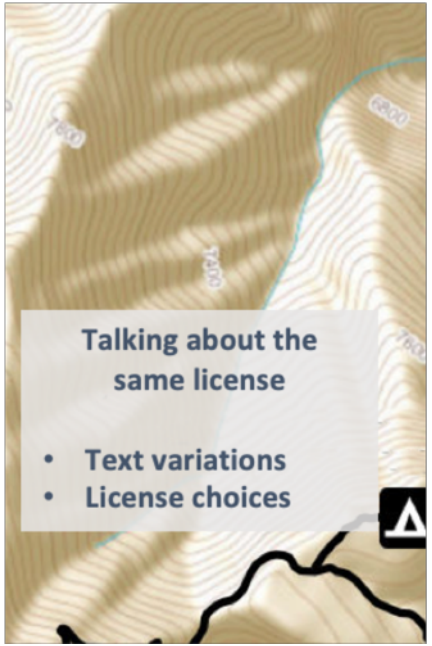

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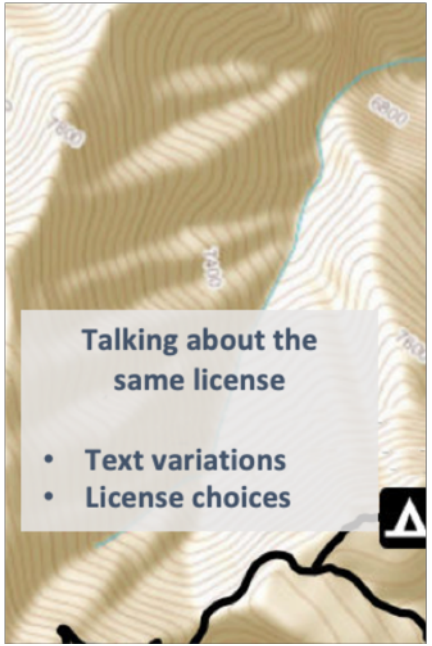

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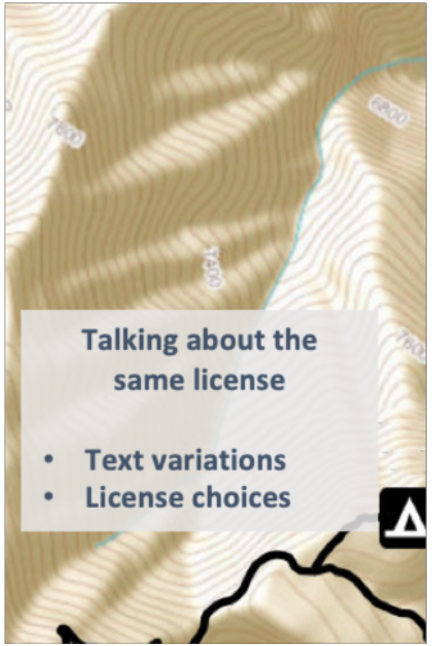

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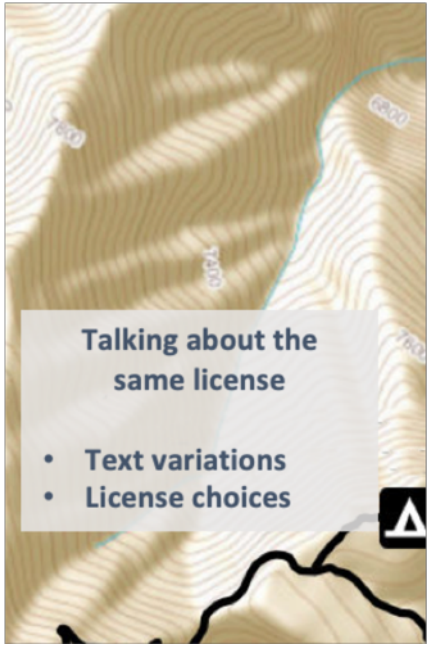

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SPDX: Talking About the Same License

Or we could talk about them this way instead:

`BSD-3-Clause`

`LicenseRef-BSD-3-Clause-custom-disclaimer`

`BSD-3-Clause-Clear`

`Sleepycat`

SPDX: Talking About the Same License

- How SPDX helps
  - License ID
  - License Expressions
  - Templated text in License List
- Tooling Examples
  - SPDX License Identifiers (spdx.org/ids)
  - spdx-license-diff (courtesy of Alan Tse)
  - REUSE Software from FSFE (reuse.software)
  - Check License (spdxtools.sourceauditor.com)
  - licensechecker / lc (https://github.com/boyter/lc)

SPDX: Talking About the Same License

In source code:

```
// SPDX-License-Identifier: MIT
```

SPDX: Talking About the Same License

In an SPDX document:

For a package's license:

```
PackageLicenseConcluded: MIT AND BSD-3-Clause
PackageLicenseDeclared: MIT
```

SPDX: Talking About the Same License

In an SPDX document:

For a file's license:

```
LicenseConcluded: MIT AND BSD-3-Clause
LicenseDeclared: MIT
```

SPDX: Talking About the Same License

In an SPDX document:

For a file's license, not on the License List:

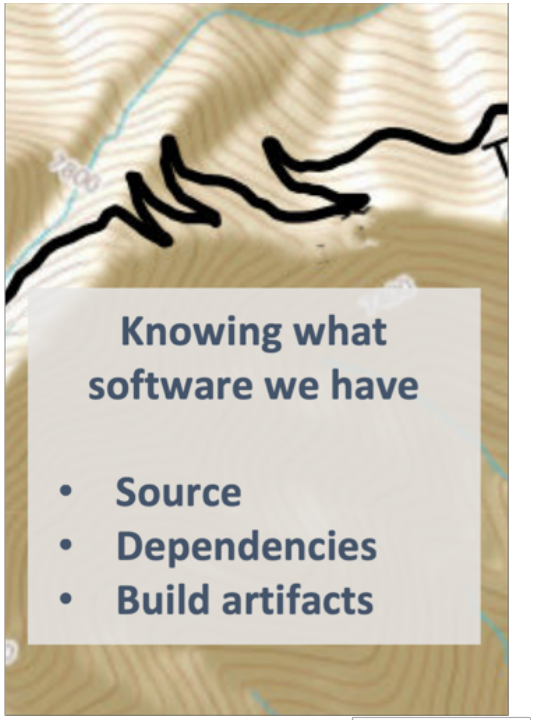
```
LicenseConcluded: LicenseRef-Acme-custom

. . .


LicenseID: LicenseRef-Acme-custom
LicenseName: Acme Source License
ExtractedText: This is the Acme Source License. ...
LicenseCrossReference: https://example.com/acme/license.txt
```

SPDX: Understanding Your Software

- How SPDX helps
  - Simple and broad concepts. A **package** is a collection of software. Can be a collection of files pulled from a repo; a .tar.gz file; a container image; a dependency without reference to individual files; ...
- Tooling Examples
  - github.com/spdx/tools, tools-python, tools-golang



SPDX: Understanding Your Software

In an SPDX document:

Referring to a dependency:

```
PackageName: requests
SPDXID: SPDXRef-requests
PackageDownloadLocation: git+ssh:kennethreitz/requests.git
FilesAnalyzed: false
```

SPDX: Understanding Your Software

In an SPDX document:

OIN Linux System Definition packages, github.com/swinslow/spdx-oin:

```
. . .
  PackageName: at-spi
  SPDXID: SPDXRef-31
  PackageVersion: 1.6.6
  PackageDownloadLocation: http://ftp.gnome.org/pub/GNOME/sources/at-spi/1.6/...
  FilesAnalyzed: false
  PackageHomePage: http://www.gtk.org/
  PackageSourceInfo: Project Download URL was http://ftp.gnome.org/pub/GNOME/...
  PackageLicenseConcluded: NOASSERTION
  PackageLicenseDeclared: NOASSERTION
  PackageCopyrightText: NOASSERTION
  PackageDescription: Assistive Technology Service Provider Interface
. . .
```

SPDX: Understanding Your Software

In an SPDX document:

Referring to a file:

```
FileName: /src/main.go
SPDXID: SPDXRef-file1
FileChecksum: SHA1: ...
```

SPDX: Understanding Your Software

In an SPDX document:

Describing a file's attributes:

```
FileName: /src/main.c
SPDXID: SPDXRef-main-c
FileType: SOURCE
```

```
FileName: /bin/mainApp
SPDXID: SPDXRef-mainApp
FileType: BINARY
FileType: APPLICATION
```

SPDX: Understanding Your Software

In an SPDX document:

Describing build artifacts:

```
FileName: /src/main.c
SPDXID: SPDXRef-main-c

FileName: /bin/mainApp
SPDXID: SPDXRef-mainApp

Relationship: SPDXRef-main-c GENERATES SPDXRef-mainApp
```

SPDX: Gathering Software Information

- How SPDX helps
  - Provides a structured, **machine-readable** and **human-readable** format for this information
- Tooling Examples
  - FOSSology
  - ScanCode
  - SPDX Maven Plugin
  - Proprietary tools

SPDX: Gathering Software Information

In an SPDX document:

Licenses and copyright notices in a dependency:

```
PackageName: requests
SPDXID: SPDXRef-requests
FilesAnalyzed: false
PackageLicenseConcluded: Apache-2.0 AND BSD-3-Clause
PackageLicenseDeclared: Apache-2.0
PackageCopyrightText: Copyright 2018 Kenneth Reitz
```

SPDX: Gathering Software Information

In an SPDX document:

Referring to a dependency, omitting this info:

```
PackageName: requests
SPDXID: SPDXRef-requests
FilesAnalyzed: false
PackageLicenseConcluded: NOASSERTION
PackageLicenseDeclared: NOASSERTION
PackageCopyrightText: NOASSERTION
```

SPDX: Gathering Software Information

In an SPDX document:

Licenses and copyright notices in a file:

```
FileName: /src/main.go
SPDXID: SPDXRef-file1
FileChecksum: SHA1: ...
LicenseConcluded: Apache-2.0 AND MIT
LicenseInfoInFile: MIT
FileCopyrightText: Copyright Steve Winslow
```

SPDX: Gathering Software Information

In an SPDX document:

Referring to a file, omitting this info:

```
FileName: /src/main.go
SPDXID: SPDXRef-file1
FileChecksum: SHA1: ...
LicenseConcluded: NOASSERTION
LicenseInfoInFile: NOASSERTION
FileCopyrightText: NOASSERTION
```

SPDX: Gathering Software Information

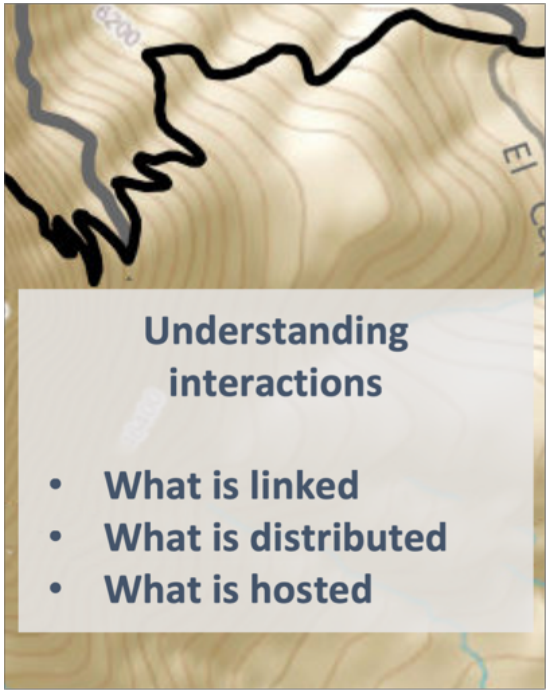
In an SPDX document:

Describing security vulnerabilities:

```
PackageName: spring_framework
SPDXID: SPDXRef-springFramework
FilesAnalyzed: false
ExternalRef: SECURITY cpe23Type
  cpe:2.3:a:pivotal_software:spring_framework:
  4.1.0:*:*:*:*:*:*:*
```

SPDX: Understanding Software Interactions

- How SPDX helps
  - The Relationship field provides a rich vocabulary for describing ways that files and packages relate and interact with one another
- Tooling Examples
  - SPDX Maven plugin
  - opportunities to improve here...



SPDX: Understanding Software Interactions

In an SPDX document:

Describing build process:

```
FileName: /src/main.c
SPDXID: SPDXRef-main-c

FileName: /bin/main.o
SPDXID: SPDXRef-main-o

Relationship: SPDXRef-main-c GENERATES SPDXRef-main-o
```

SPDX: Understanding Software Interactions

In an SPDX document:

Describing patches:

```
FileName: /src/patch001
SPDXID: SPDXRef-patch001

FileName: /src/driver.c
SPDXID: SPDXRef-driver.c

Relationship: SPDXRef-patch001 PATCH_FOR SPDXRef-driver-c
```

SPDX: Understanding Software Interactions

In an SPDX document:

Describing linked files:

```
FileName: /obj/LGPL-lib.o
SPDXID: SPDXRef-LGPL-lib

FileName: /obj/Proprietary.o
SPDXID: SPDXRef-Proprietary

Relationship: SPDXRef-LGPL-lib DYNAMIC_LINK SPDXRef-Proprietary
                                or
Relationship: SPDXRef-LGPL-lib STATIC_LINK SPDXRef-Proprietary
```

SPDX: Understanding Software Interactions

In an SPDX document:

Describing files that might be less relevant for compliance:

```
FileName: /src/project.c
SPDXID: SPDXRef-projectCode

FileName: /src/otherFile
SPDXID: SPDXRef-otherFile

Relationship: SPDXRef-otherFile TEST_CASE_OF SPDXRef-projectCode

Relationship: SPDXRef-otherFile BUILD_TOOL_OF SPDXRef-projectCode
```

SPDX: Understanding Software Interactions

In an SPDX document:

Describing dependency relationships:

```
FileName: /src/myCode.py
SPDXID: SPDXRef-myCode

PackageName: requests
SPDXID: SPDXRef-requests

Relationship: SPDXRef-myCode HAS_PREREQUISITE SPDXRef-requests

Relationship: SPDXRef-requests HAS_PREREQUISITE SPDXRef-urllib3
```

SPDX: Communicating Open Source Info

- How SPDX helps
  - An SPDX document lays out the license, attribution and copyright notices you need to provide, licenses requiring source, ...
  - Provide the SPDX document itself, enable downstream users to use for their own compliance processes
- Tooling Examples
  - SPDX to Spreadsheet (spdxtools.sourceauditor.com)
  - License coverage grader (https://github.com/spdx/license-coverage-grader)

SPDX: Communicating Open Source Info

In an SPDX document:

Communicating licenses and copyright notices:

```
PackageLicenseConcluded: Apache-2.0 AND BSD-3-Clause AND
                         LicenseRef-Acme-custom

PackageCopyrightText: Copyright 2018 Acme Software
```

SPDX: Understanding Software Interactions

In an SPDX document:

Tracking corresponding source code:

```
FileName: /bin/binary
SPDXID: SPDXRef-binary
```

```
FileName: /src/sources.tar.gz
SPDXID: SPDXRef-sources
```

```
Relationship: SPDXRef-binary DISTRIBUTION_ARTIFACT SPDXRef-sources
```

SPDX: Understanding Software Interactions

In an SPDX document:

Providing other metadata about your software:

```
FileName: /bin/binary
SPDXID: SPDXRef-binary
```

```
FileName: /pom.xml
SPDXID: SPDXRef-pom
```

```
Relationship: SPDXRef-pom METAFILE_OF SPDXRef-binary
```

Create and Refine Policies

- How SPDX helps
  - It doesn't, at least not directly
  - SPDX documents carry information that your policies and processes can act upon

Create and Refine Policies

From an SPDX document:

Deciding whether to fail a build because of licenses:

```
LicenseConcluded: NONE
LicenseConcluded: JSON
LicenseConcluded: LicenseRef-Weird-Proprietary
```

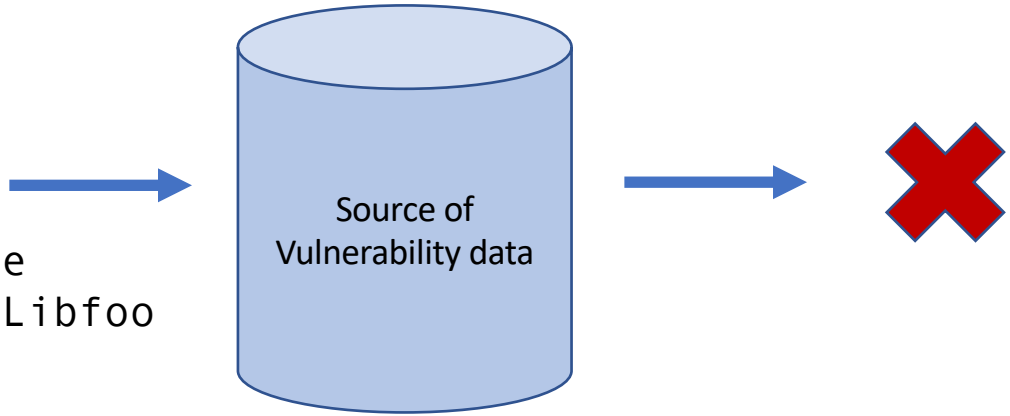
```
LicenseConcluded: GPL-3.0-only
LicenseConcluded: Apache-2.0
```

Create and Refine Policies

From an SPDX document:

Deciding whether to fail a build because of vulnerabilities:

```
PackageName: LibFoo
PackageVersion: 1.2.17a
Relationship: SPDXRef-mycode
  HAS_PREREQUISITE SPDXRef-Libfoo
```

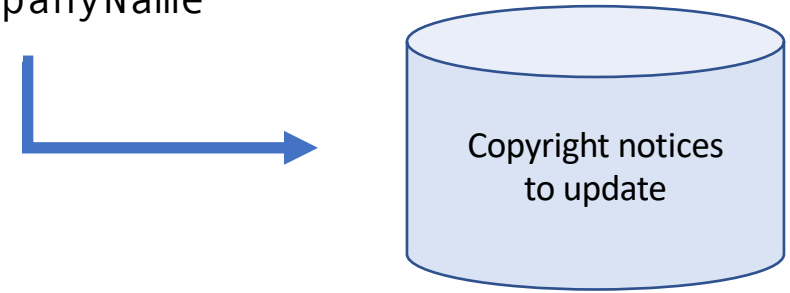


Create and Refine Policies

From an SPDX document:

Or automate any other kind of findings and actions:

```
FileName: /src/myCode.c
FileCopyrightText: Copyright OldCompanyName
```



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