Free and Open Source Software

Covering OSS Compliance with Software Tools

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SOFTWARE COMPLIANCE ACADEMY

Overview

Main kinds of tools in the area of license compliance include *(but are not limited to)*:

- Source code scanning
- License scanning
- Binary scanning
- Dev Ops integration
- Component management

1. License Scanner

License Scanner: Introduction

Purpose:

Identifies licenses and license relevant statements

Other Identifications:

Copyright statements, author statements, acknowledgements

Also of interest:

Export control statements, more static code analysis

License Scanner: Solved Problem

Problem: Identify licensing in Open Source Software packages

Licensing in Open Source Software

- Licensing of OSS can be heterogeneous, different licensing applies to parts of OSS
- Licensing statements are not uniform
- Many licenses exist, number growing

-> Tool based licensing identification required for complicated licensing situations

License Scanner: Technical

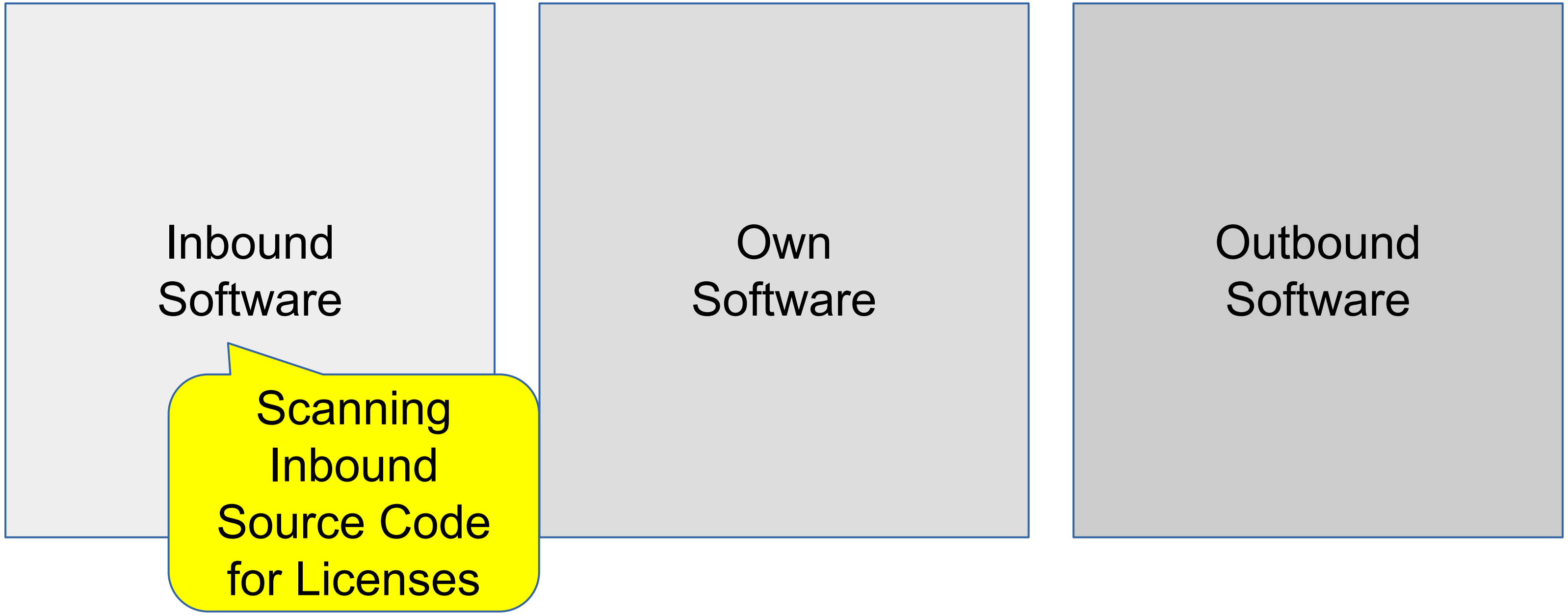
Mode of operation: Tool searches in content
for license relevant keywords, phrases, license texts

- Searching in every file of software uploaded:
  requires source code distribution
- Different approaches can be applied:
  regular expressions, text comparison, phrase collection
- Requires database of license texts, licensing statements
- Comparison with existing license texts enables exact identification
- Licensing information can summarized for open source packages

License Scanner: More remarks

- License scanning does not require huge database
- However, updates are necessary as licensing statements evolve and new licenses are still created
- Identified licensing information of a software package can be exchanged using SPDX files
- Approach makes sense for OSS licenses, commercial licensing is even more heterogeneous
- License identification precision depends on available licensing information and may require expert knowledge for analysis

License Scanner Main Usage



2. Binary Scanner

Binary Scanner: Introduction

Purpose:

- Identifies used software packages in software binaries

Other identifications:

- Can also determine the versions of software packages

Also of interest:

- Identifying used software packages for creating the binary also enables identification of vulnerabilities

Binary Scanner: Solved Problem

Problem: A binary is comprised of different software packages, but if not declared, not obvious to determine

- Applies in compiled programming languages: programming language code is translated (=compiled) into machine executable code (machine = processor)
- Script languages (e.g. JavaScript) are not compiled
- Binaries are usually not readable, understanding contents difficult
- However, identification of contents can be inevitable for understanding required license compliance tasks

Binary Scanner: Technical

- Compiled machine language
  can contain characteristic elements
- For example used string variables (=text)
  or other content compiled into the binary
- Simpler method: capturing file names,
  or for run-time code (e.g. Java): method and field names
- Requires database of mapping
  from source code to resulting artefacts in binary

Binary Scanner: Remarks

- Binary scanning is a heuristic,
  secure mapping not supported for every possible binary
- Topic connected with reproducible builds
  (then, binaries can be compared more efficiently)
- Database requires updates because,
  because new software is published every day
  - (similar with source code scanning)

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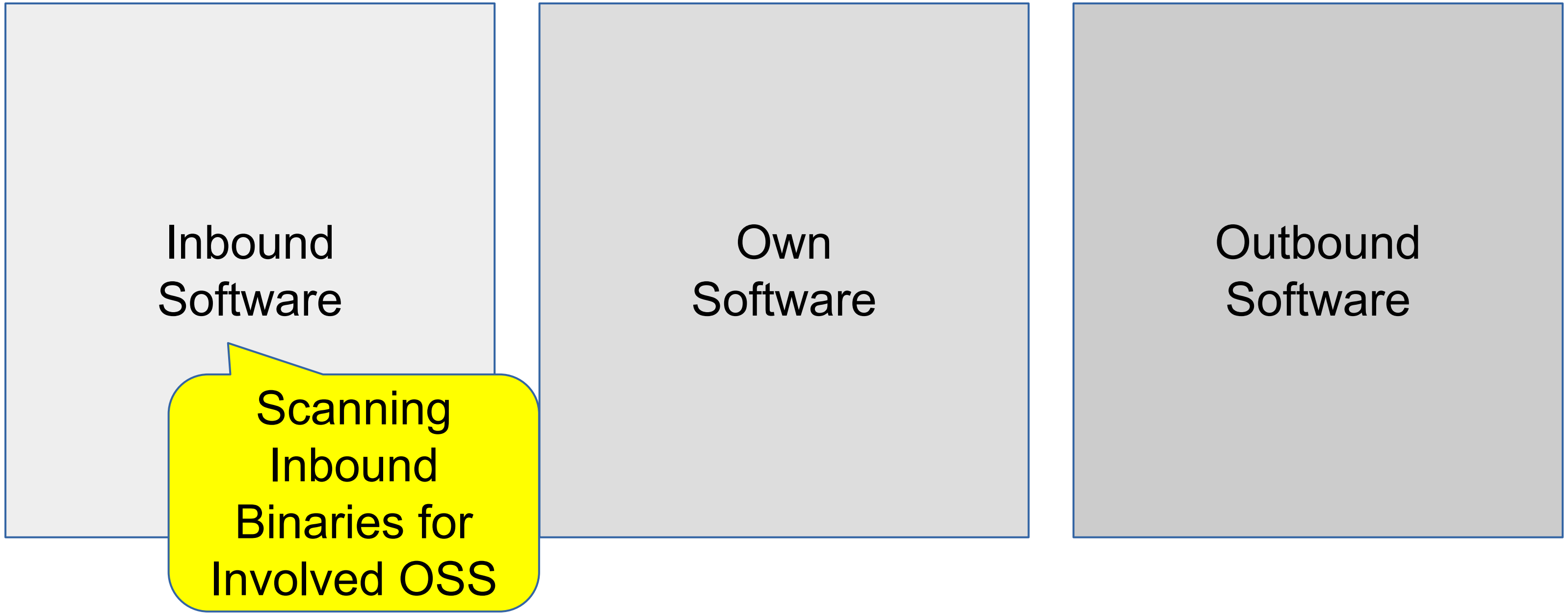
Binary Scanner Main Usage



3. Source Code Scanner

Source Code Scanner: Introduction

Purpose:

Can identify published origin of source code and other files

Other Identifications:

Icons, images, style descriptions, XML schemes, documentation

Also of interest:

Programming examples, from blogs and best practise Websites

Source Code Scanner: Solved Problem

Problem: how to understand that source code or other files have been taken from elsewhere, not self-created, and not declared

If "own" software is not entirely own software and not understood:

- Missing rights for business case in "own" software
- But distribution requires distribution rights are available
- Identification of origin is first step to understand available rights

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Source Code Scanner: Technical

Mode of operation: upload source code or just files or fingerprints of it, get origin in case it is captured by database

- File contents are compared
  with contents from (huge) database of published contents
- Fingerprinting of file contents (“hashing”)
  allow for accelerated search and storage in database
- Not only coverage of entire files, but fragments of it
- Database requires updates: every day new published OSS
- Content is large (e.g. the entire GitHub)

Source Code Scanner: More Remarks

Once origin of source is identified,
more metadata can be made available:

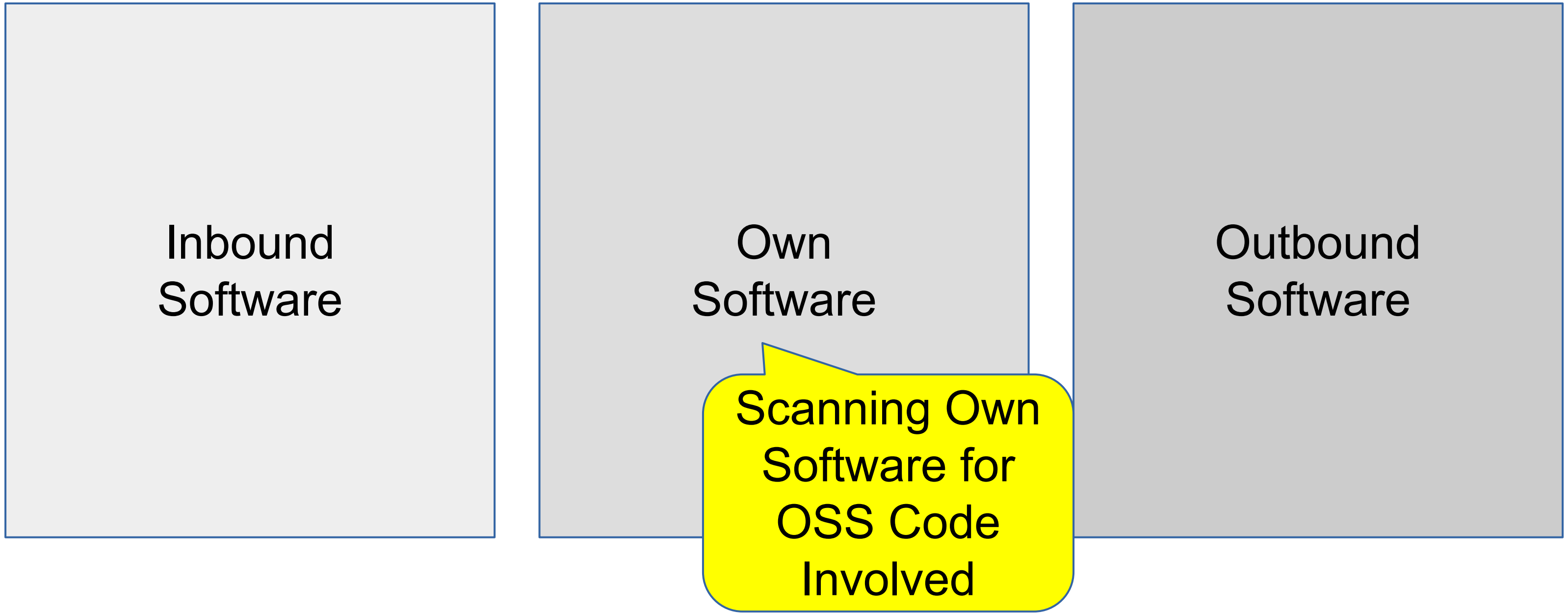
- Licensing
- Vulnerabilities

Potential for integration:

- Development toolchain
- Reporting, BOM

Matched content may require expert knowledge
to determine relevance

Source Scanner Main Usage



4. Dev Ops Integration

Dev Ops Integrations: Introduction

Purpose:

- Uses the information from building the software to determine OSS used

Other identifications:

- Can be combined with source code scanning, license scanning, binary scanning

Also of interest:

- Resulting identification of elements during building the software enables the creation of a bill of material (BOM)

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Dev Ops Integrations: Solved problem

Problem: for larger software projects
a tool based approach is inevitable to understand involved OSS

- Modern software building environments have defined dependencies
- During compilation, dependencies can be captured
  to understand used dependencies
- License compliance integrated
  into the Dev Ops tooling implements automation
- Reporting as part of Dev Ops tooling reduces manual efforts
- Enables short release cycles in an agile environment

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Dev Ops Integrations: Technical

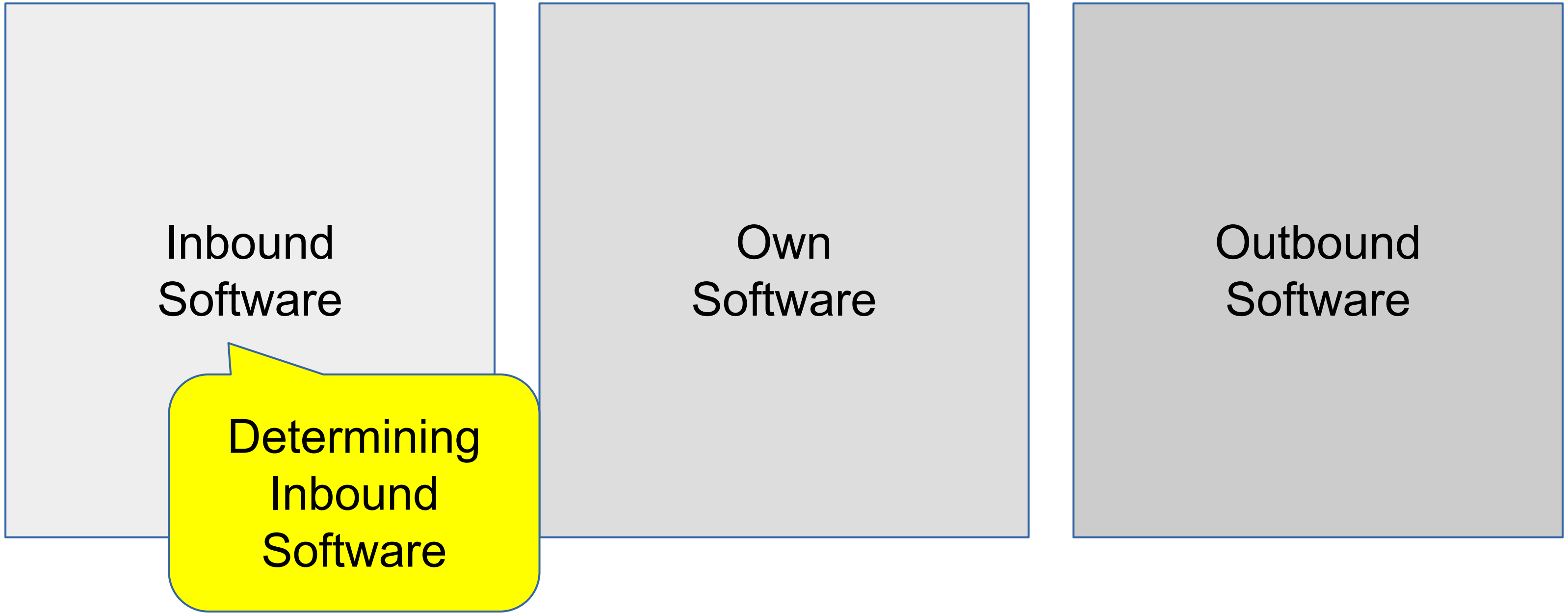
Integration into Dev Ops tooling requires customization

- Building software depends on used technology
  as well as individually setup tooling
- Additional efforts, if software is comprised of different technologies
- Today, building environments sometimes contain already metadata about licensing of involved OSS software
- Identified software elements may require additional checks to determine actual licensing information
  (in case of heterogeneous licensing)

Dev Ops Integrations: Remarks

- Today, a custom task, nothing to "download and double-click"
- Tooling approach allows for differential approach: once setup and checked, only new dependencies require additional coverage

Dev Ops Integration Main Usage



5. Component Catalogue

Component Catalogue: Introduction

Purpose:

- Collect information about used software components and their use in products or projects is centrally collected and can be reused

Other purposes:

- A component catalogue captures also the used components in a product or project, maintains a so-named BOM

Also interesting:

- Enables also vulnerability management or reuse of export classifications

Component Catalogue: Solved Problem

Problem: Once analysed component w.r.t. license compliance shall not require repeated analyses, but reuse of information shall be possible

Component catalogue:

- Maps component usage in products or projects
- Makes sense if an organisation has actually multiple products
- Shows organisation the important software components
- Allows for a comprehensive overview
  about involved licensing per product

Component Catalogue: Technical

- A component catalogue can be viewed as a portal
- Database holding the catalogue information
- Another use case is archiving OSS distributions / source code
- Storing also multiple other files,
  for example license analysis reports, SPDX files
- Provides reporting output, for example OSS product documentation
- Component catalogue can be implemented as Web portal, thus accessible from various client computers in organisation

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Component Catalogue: Remarks

- Component catalogue can be integrated with other license compliance tooling: scanners can directly feed the analyses
- Also integration in Dev Ops tooling is useful to automatically create BOM of products
- Component catalogues can also serve uses cases for vulnerability management
- Another related topic is license management and license metadata

Component Catalogue Usage

Inbound Software

Own Software

Outbound Software

Creating OSS Documents

Questions?

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