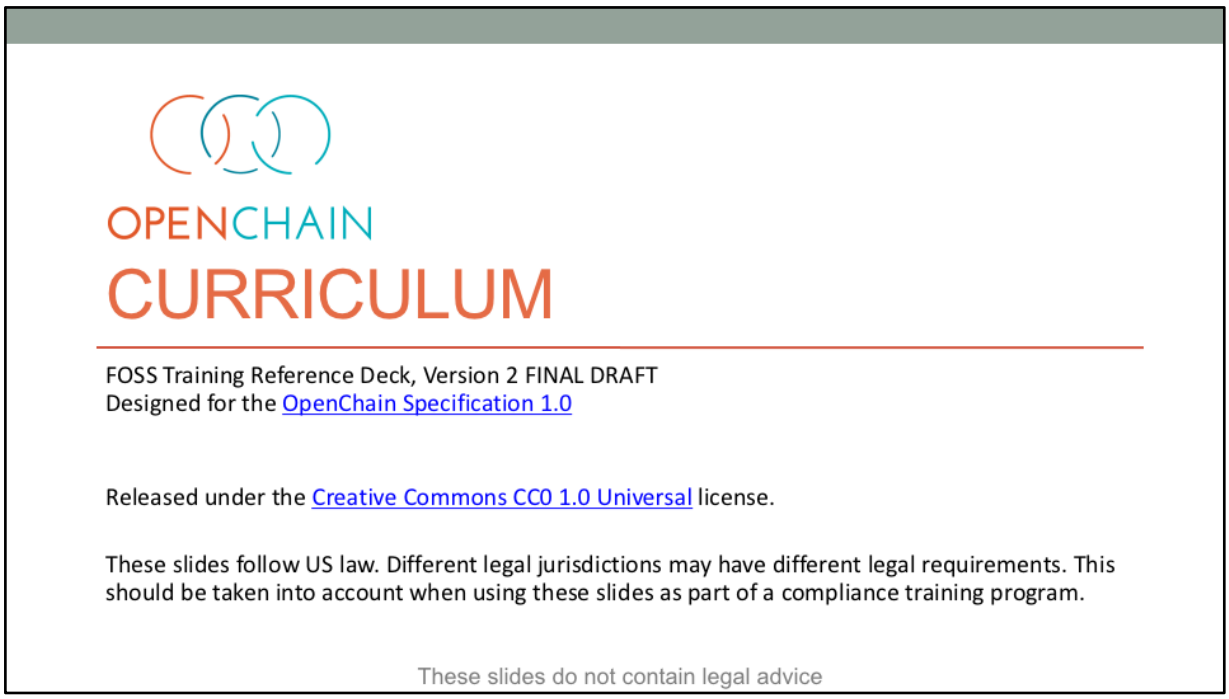


Welcome to the OpenChain Curriculum Slides. These slides can be used to help train internal teams about FOSS compliance issues and to conform with the OpenChain Specification.

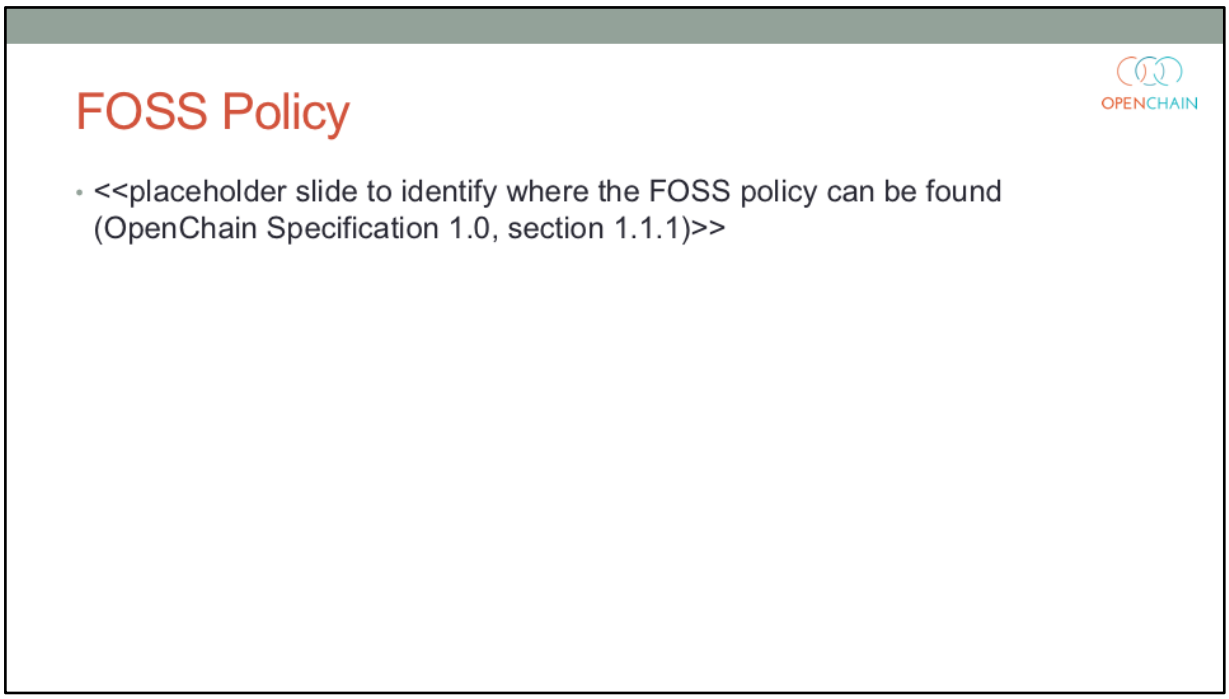
You can deliver these slides as one half-day training session or you can deliver each chapter as a separate module. Please note that each chapter has “Check Your Understanding” slides with questions and answers in the slide notes. These can be used as the basis for in-house tests for FOSS compliance.

Contents

OPENCHAIN

1. What is Intellectual Property?
2. Introduction to FOSS Licenses
3. Introduction to FOSS Compliance
4. Key Software Concepts for FOSS Review
5. Running a FOSS Review
6. End to End Compliance Management (Example Process)
7. Avoiding Compliance Pitfalls

This slide is relevant to providing either a single three hour training session or explaining how a series of shorter sessions focused on “per chapter” training will work.



This slide is intended to help a company identify where their internal FOSS policy is located in the company documentation.

CHAPTER 1

What is Intellectual Property?

This chapter is focused on the “big picture” of Intellectual Property. This chapter is probably most useful for managers or developers who might not understand clearly the fundamentals of copyright, patent and trademark law.

What is “Intellectual Property”?

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- Copyright: protects original works of authorship
  - Protects expression (not the underlying idea)
  - Software, books, audiovisual materials, semiconductor masks
- Patents: useful inventions that are novel, useful, non-obvious
  - Limited monopoly to incentivize innovation
- Trade secrets: protects confidential and valuable information
- Trademarks: protects marks (word, logos, slogans, color, etc.) that identify the source of the product
  - Consumer and brand protection; avoid consumer confusion and brand dilution

This chapter will focus on copyright and patents, the areas most relevant to FOSS compliance

This overview is not intended to cover all aspects of Intellectual Property. It is intended to provide context for the “big picture” and to establish that today we are only discussing copyright and patents, the areas most relevant to FOSS compliance.

Copyright concepts in software

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- Basic rule = copyright protects creative works
- Copyright generally applies to literary works, such as books, movies, pictures, music, maps
- Software is protected by copyright, not the functionality (that's protected by patents) but the expression (creativity in implementation details)
- The copyright owner only has control over the work that he or she created, not someone else's independent creation

This slide explains the "big picture" of copyright in software.

Copyright rights most relevant to software

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- The right to *reproduce* the software – making copies
- The right to create "*derivative works*" – making modifications
  - The term derivative work refers to a new work based upon an original work to which enough original creative work has been added so that the new work represents an original work of authorship rather than a copy (note that this is a term of art under US law)
- The right to *distribute*
  - Distribution is generally viewed as the provision of a copy of a piece of software in binary or source code form to another entity (an individual or organization outside your company or organization)

Note: The interpretation of what constitutes a “derivative work” or a “distribution” is subject to debate in the FOSS community and within FOSS legal circles

This slide clarifies the most important parts of copyright law to software.

Patent concepts in software

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- Patents protect functionality - this can include a method of operation, such as a computer program
  - Does not protect abstract ideas, laws of nature
- The patent owner has the right to stop anybody from exercising that functionality, regardless of independent creation
- Other parties who want to use the technology may seek a patent license (which may grant rights to use, make, have made, sell, offer for sale, and import the technology)

This slide explains patent concepts relevant to software.

Licenses

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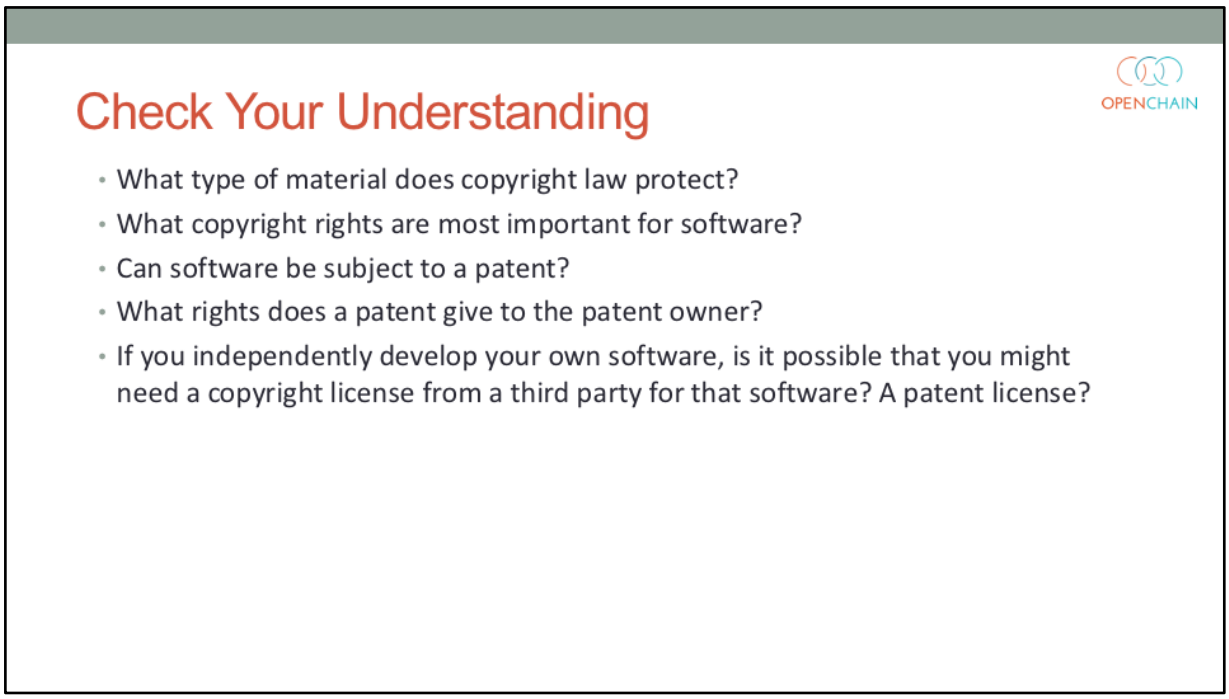
- A "license" is the way a copyright or patent holder gives permission or rights to someone else
- The license can be limited to:
  - Types of use allowed (distribution, derivative works / to make, have made, manufacture)
  - Exclusive or non-exclusive terms
  - Geographical scope
  - Perpetual or time limited duration
- The license can have conditions on the grants, meaning you only get the license if you comply with certain obligations
  - E.g, provide attribution, give a reciprocal license
- May also include contractual terms regarding warranties, indemnification, support, upgrade, maintenance

This slide explains what is a “license.” This is different to a contract under US law. This slides explains the boundaries of what can be in a license.



Copyright protects original works of authorship.It's different than patent in that copyright protects the expression of an idea, whereas patent protects the underlying idea itself. Examples of works of authorship include photographs, songs, and computer code.

Most important copyright concepts for software are: right to reproduce, right to make creative works (or right to modify), and right to distribute.

Software can be subject to a patent. Patent protects method of operation, such as computer program. However, patent protects functionality, and not abstract ideas.

Patent holder can exclude others from practicing the patent, regardless of whether the others have independently created the product.

If you have independently developed your own software, then you may not need a copyright license if you can show the independent development and you had no access to the copyrighted work in question. This is difficult if the copyrighted work is popular such that it'd be reasonable to assume that you had access. If your software reads on a patent, then you will need a patent license regardless of whether you've

independently developed the software. An example of this would be FFMpeg, which is a free software project that provides the codecs for encoding and decoding videos. However, you would still need a patent license to encode and decode a certain format.

CHAPTER 2

Introduction to FOSS Licenses

This chapter is useful for lawyers, managers or developers who may not be familiar with FOSS licenses.

FOSS Licenses

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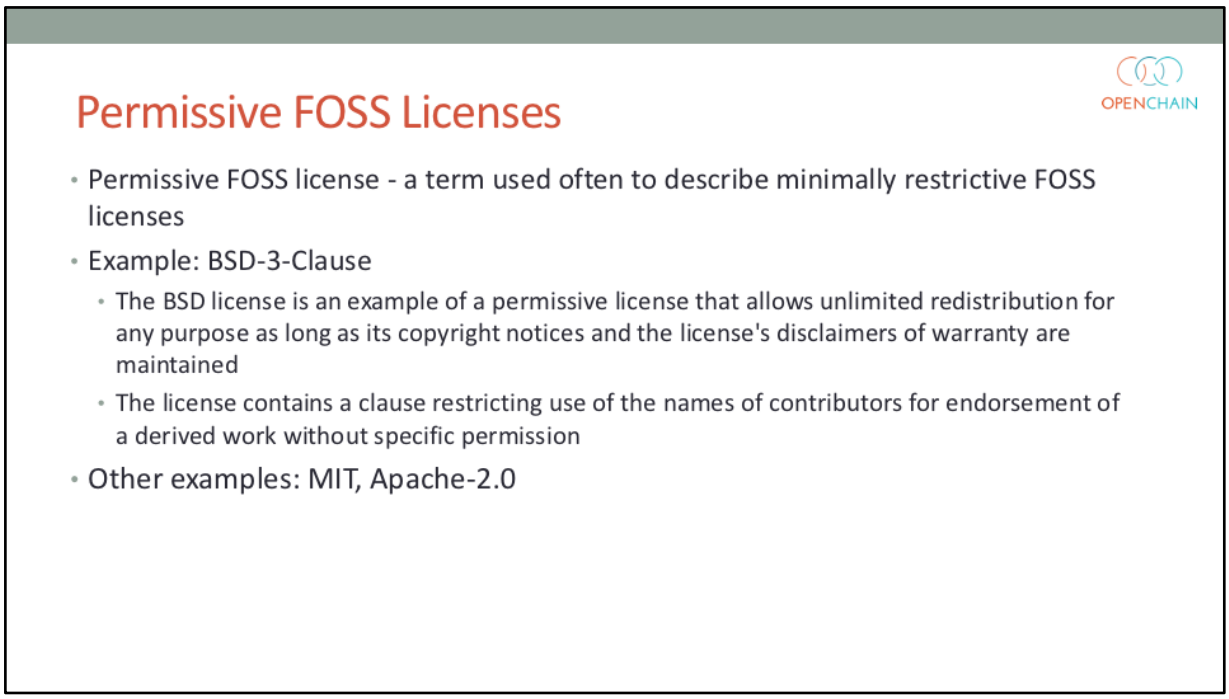
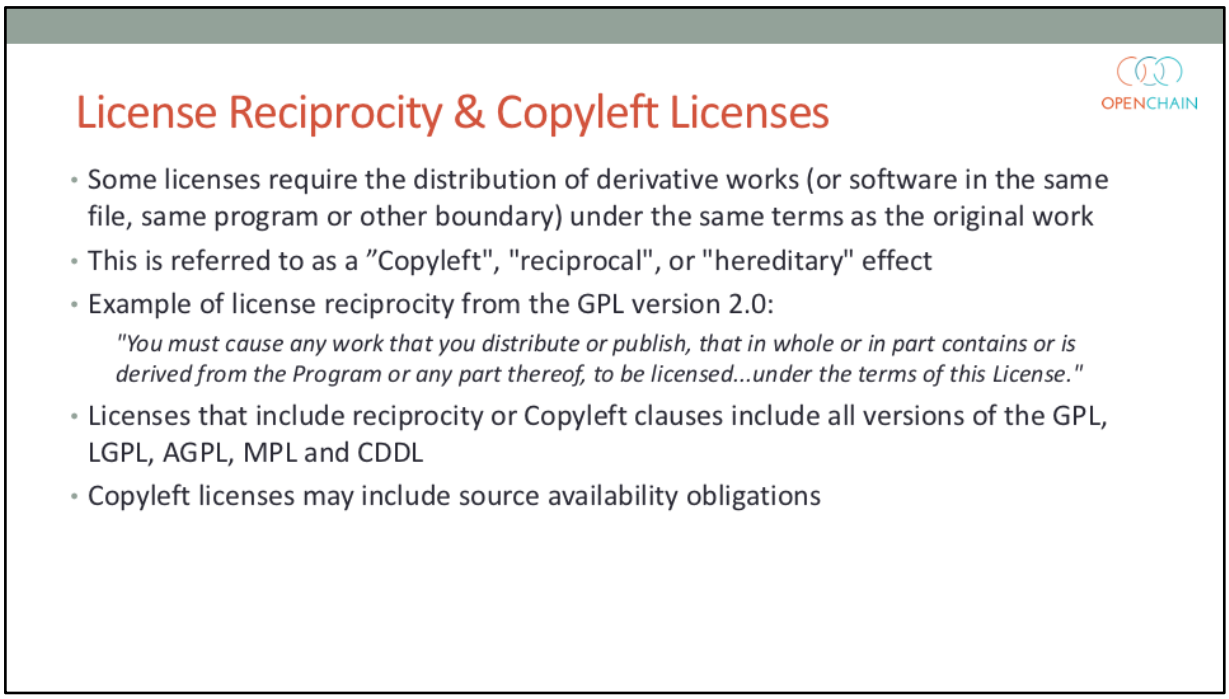
- Free and FOSS Software licenses generally make source code available under terms that allow for modification and redistribution
- FOSS licenses may have conditions related to providing attributions, copyright statement preservation, or a written offer to make the source code available
- One popular set of licenses are those approved by the FOSS Initiative (OSI) based on their FOSS Definition (OSD). A complete list of OSI-approved licenses is available at http://www.opensource.org/licenses/

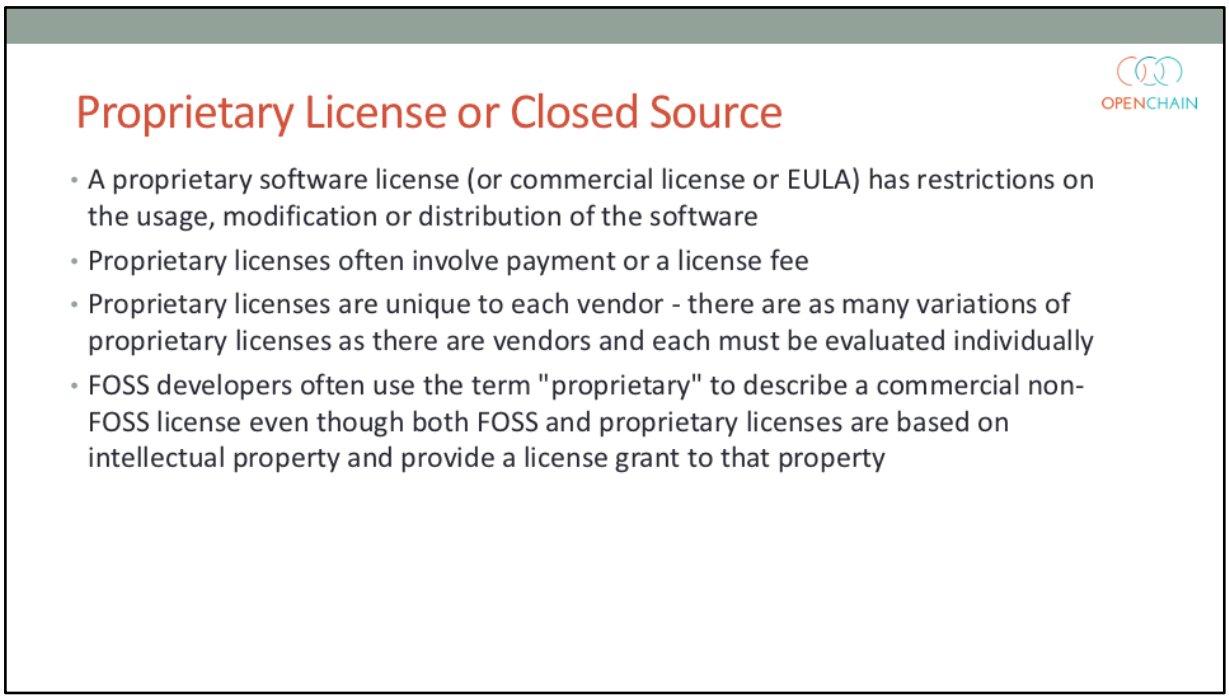
This slide provides the “big picture” about what FOSS licenses do. It also explains a resource where you can find out more about some FOSS licenses.



This slide explains "permissive" FOSS licenses, the most basic type of FOSS license, which usually have minimal requirements. The most basic requirement is to include a copyright notice.



This slide explains reciprocity and Copyleft, a more complex type of FOSS license that have additional requirements above permissive licenses. They require distribution of the original work and derivative works under the same terms as the original work.



This slide explains proprietary or closed source licenses. These licenses often have very different requirements and rules compared to FOSS licenses.

Other Licensing Situations

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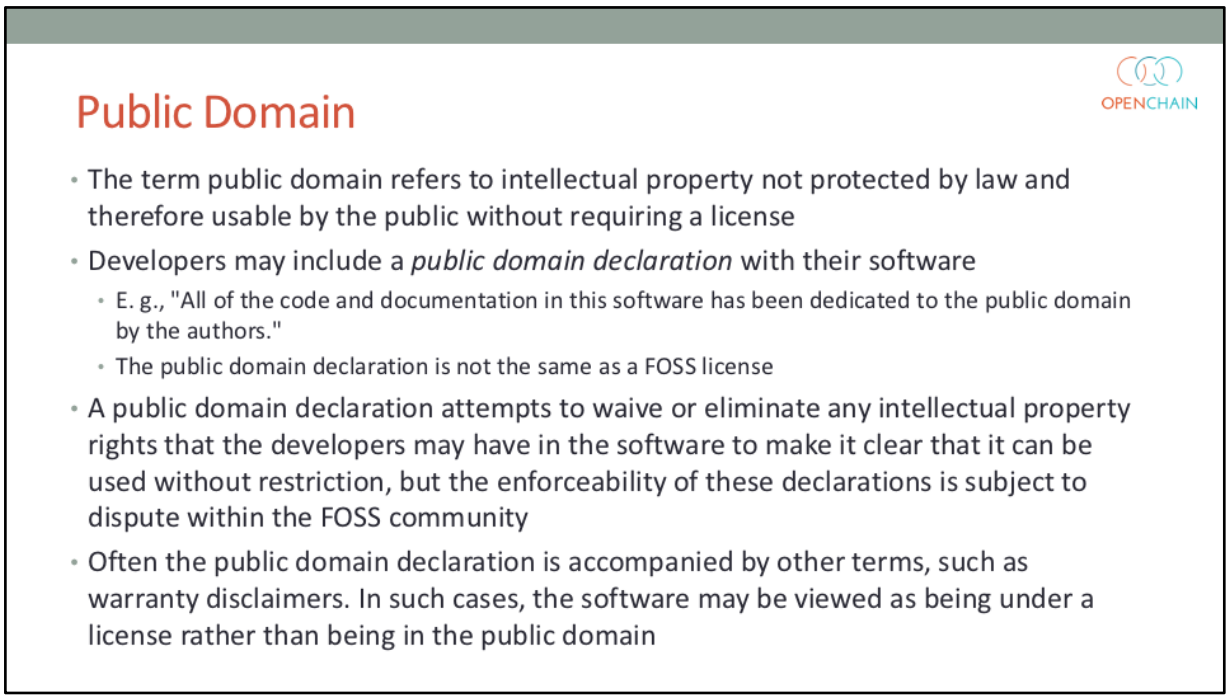
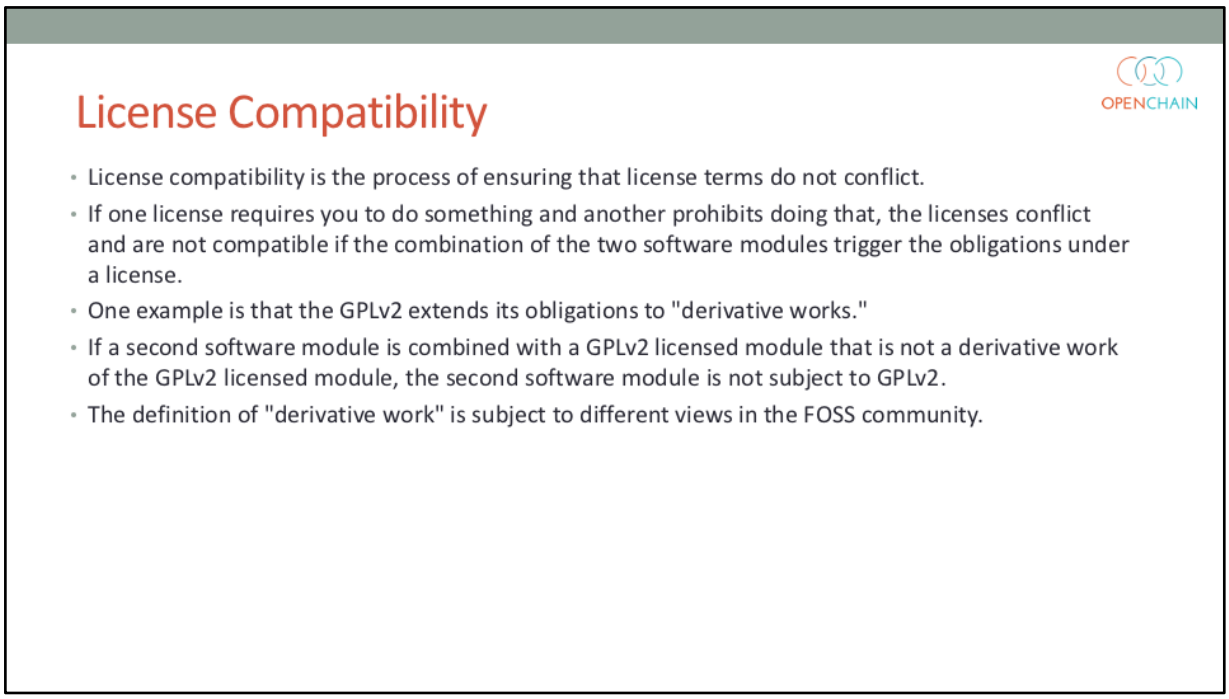
- Freeware - software distributed under a proprietary license at no or very low cost
  - The source code may or may not be available, and creation of derivative works is usually restricted
  - Freeware software is usually fully functional (no locked features) and available for unlimited use (no locking on days of usage)
  - Freeware software licenses usually impose restrictions in relation to copying, distributing, and making derivative works of the software, as well as restrictions on the type of usage (personal, commercial, academic, etc.)
- Shareware - proprietary software provided to users on a trial basis, for a limited time, free of charge and with limited functionalities or features
  - The goal of shareware is to give potential buyers the opportunity to use the program and judge its usefulness before purchasing a license for the full version of the software
  - Most companies are very leery of Shareware, because Shareware vendors often approach companies for large license payments after the software has freely propagated within their organizations.
- Freeware and Shareware are not FOSS

There are other types of license used. Sometimes these are confused with FOSS but their requirements are actually different. Freeware or Shareware licensing should not be regarded as the same or compatible with FOSS licensing.



This slide explains public domain, a type of release that means the work is released without any restrictions whatsoever by the authors. In the US public domain software can be included in FOSS code, but it should be noted that not all legal jurisdictions recognize the existence or permit the release of authorship under public domain. Germany is one example.



This slide explains license compatibility, the way of understanding what licenses can be used together. Some FOSS licenses are compatible with each other. Some are incompatible. This is an important consideration when choosing code and choosing licenses.

Notices

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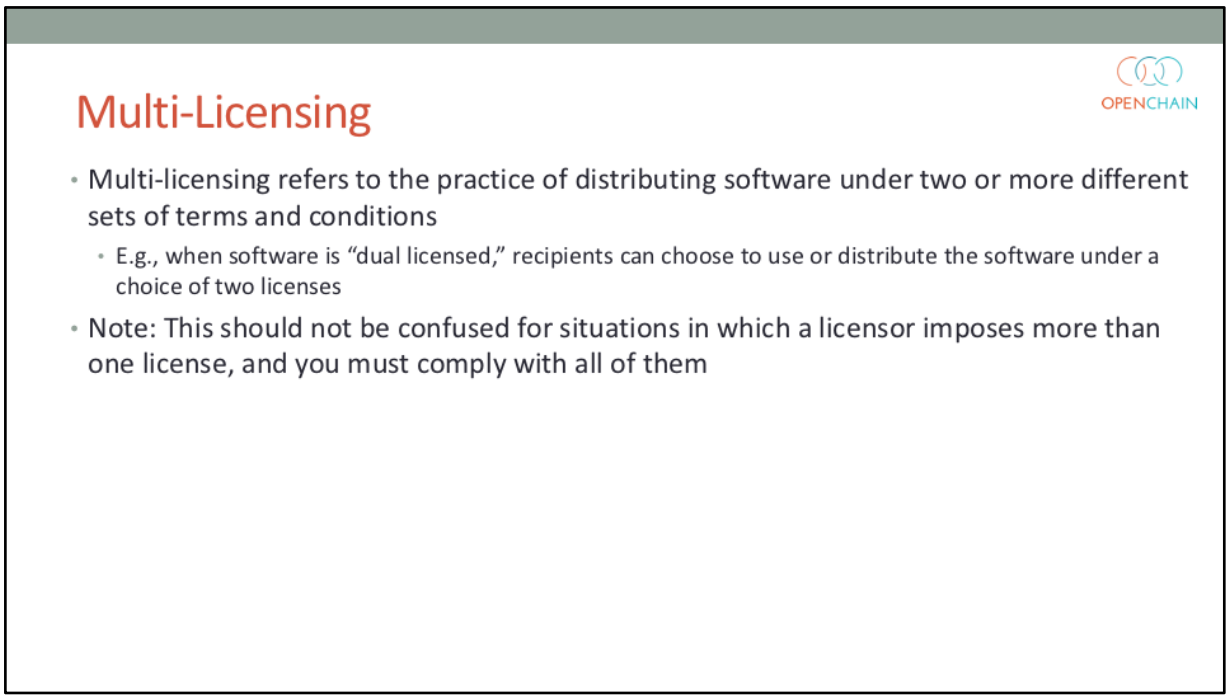
Notices, such as text in comments in file headers, often provide authorship and licensing information. FOSS licenses may also require the placement of notices in source code or documentation to give credit to the author (an attribution) or to make it clear the software includes modifications.

- **Copyright notice** - an identifier placed on copies of the work to inform the world of copyright ownership. Example: Copyright © A. Person (2016).
- **License notice** - a notice that acknowledges the license terms and conditions of the FOSS included in the product.
- **Attribution notice** - a notice included in the product release that acknowledges the identity of the original authors of the FOSS included in the product.
- **Modification notice** – a notice that you have made modifications to the source code of a file, such as adding your copyright notice to the top of the file.

This slide explains notices, the text comments in files that explain authorship and licensing, and which are often regarded as the most important way of knowing what license applies to a file.



This slides explains multi-licensing. This is the situation where more than set of license terms can apply to a piece of software.

Conjunctive = Multiple licenses apply
GPL-2.0 project also includes code under BSD-3-Clause
In this situation you have to comply with both sets of license terms
Disjunctive = Choice of one open source license or another
Mozilla tri-license
Jetty
Ruby

Disjunctive licensing may be something important to explore more deeply when creating a FOSS policy.

Under disjunctive licensing you have a choice of licensing, i.e. GPL and a more permissive license option, you may choose which license you are going to distribute under depending on license compatibility, license requirements. Sometimes a project has a disjunctive licensing situation, but only one license is included in your code – so perhaps the person you got the code from

already made this choice. If they choose the license you weren't going to use, now you might have to consider if you should figure out who the original © holder is and get the code directly from them

Example:
MPL 1.1/GPL 2.0/LGPL 2.1 - -
"The contents of this file are subject to the Mozilla Public License Version - 1.1 (the "License"); you may not use this file except in compliance with - the License.
. . .
Alternatively, the contents of this file may be used under the terms of - either the GNU General Public License Version 2 or later (the "GPL"), or - the GNU Lesser General Public License Version 2.1 or later (the "LGPL"), - in which case the provisions of the GPL or the LGPL are applicable instead - of those above.

If you wish to allow use of your version of this file only - under the terms of either the GPL or the LGPL, and not to allow others to - use your version of this file under the terms of the MPL, indicate your - decision by deleting the provisions above and replace them with the notice - and other provisions required by the LGPL or the GPL. If you do not delete - the provisions above, a recipient may use your version of this file under - the terms of any one of the MPL, the GPL or the LGPL. "

"**dual**" = confusing term that may be used for any of these situations, but usually refers to business model of OSS license or commercial license choice
For more on dual-licensing as a business model: http://oss-watch.ac.uk/resources/duallicence2

Check Your Understanding

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- What is a FOSS license?
- What are typical obligations of a permissive FOSS license?
- Name some permissive FOSS licenses.
- What does license reciprocity mean?
- Name some copyleft-style licenses.
- What needs to be distributed for code used under a copyleft license?
- Are Freeware and Shareware software considered FOSS?
- What is a multi-license?
- What information may you find in FOSS Notices, and how may the notices be used?

FOSS licenses are Free and FOSS Software licenses generally make source code available under terms that allow for modification and redistribution.

Typical obligations of a permissive FOSS license are that the copyright notice and warranty disclaimer are included with the software. Very often, the license would expressly prohibits users from using the author's name without permission.

Examples of permissive FOSS licenses include MIT, BSD, and Apache.

License reciprocity means that the derivative work of the copyrighted work must be made available under the same license. Other names being used include "hereditary", "copyleft", "share-alike", and pejoratively"viral."

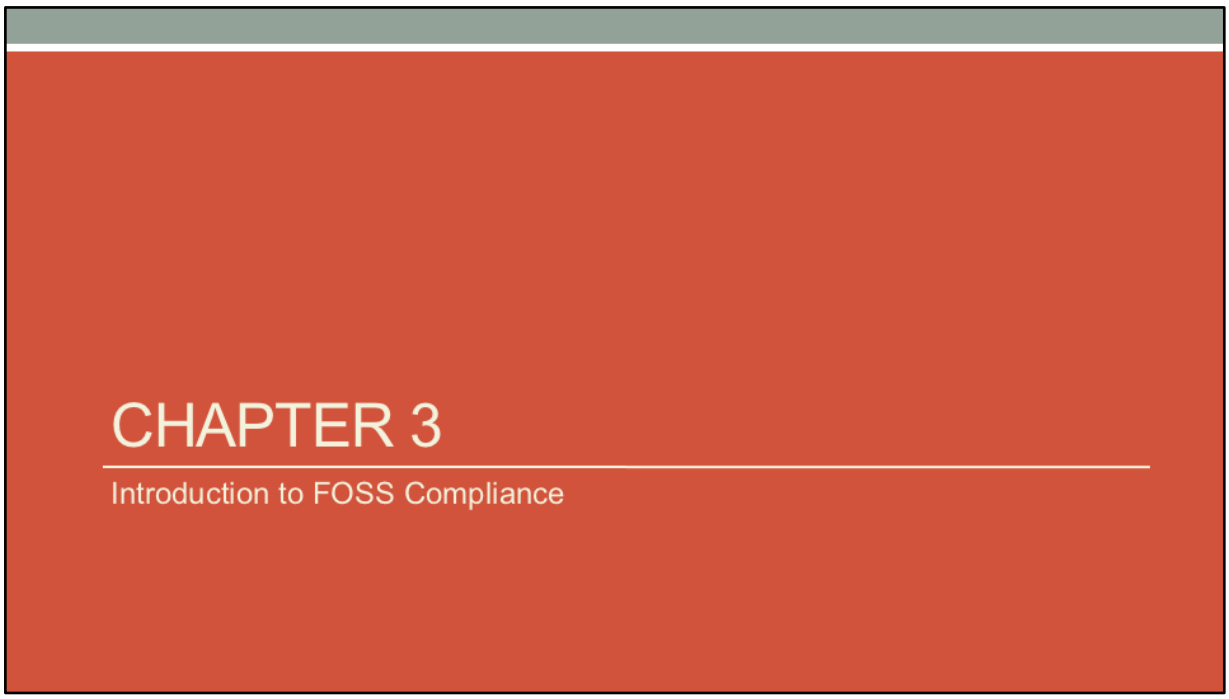
Examples of copyleft-style licenses include GPL and LGPL.

Copyleft-style licenses often have source availability obligations, which require you to provide accompanying source code when you distribute a binary version of a program or library. The source code should be of the same version and content that corresponds to the binary version you distribute.

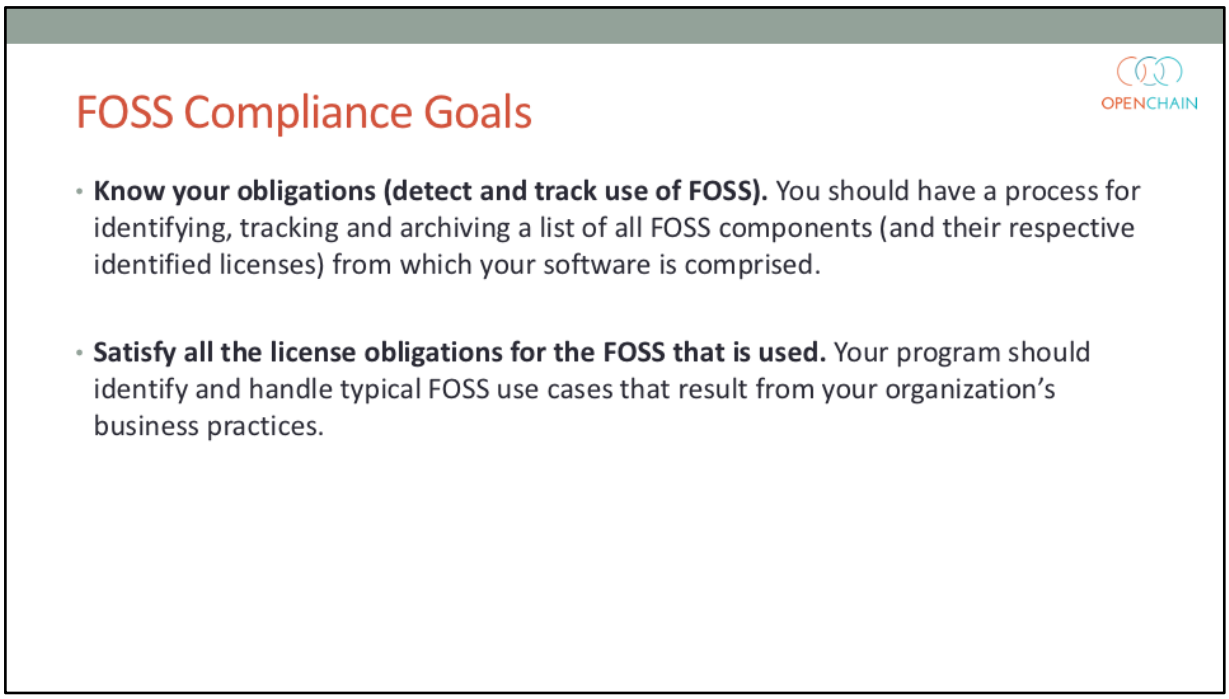
Freeware and Shareware are not FOSS.The reason is that even though freeware and shareware are available without cost, they don't allow the users to make modifications to the software.In fact, many of the freeware and shareware contain similar license restrictions common in proprietary software.

Multi-license refers to the practice where software is made available under multiple licenses. For example, an open source software can be dual-licensed under MIT and GPLv2. In that case, you are free to choose the license that suits your need.

FOSS Notices may include information about the identity of the copyright holders and the license governing the software. FOSS Notices may provide notice about modifications. Some licenses require that FOSS Notices be retained or reproduced for attribution purposes.



This chapter covers the big picture of FOSS compliance. It explains how compliance works from first principles.



This slide explains that FOSS compliance is really a two-part goal. The first is to know your obligations and have a process to support this knowledge. The second is to satisfy the obligations.

What Compliance Obligations Must Be Satisfied?

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Depending on the license(s) involved, obligations could consist of:

- **Attribution and Notices.** Inclusion of copyright and license text in the source code and/or product documentation or user interface, so that downstream users know the origin of the software and their rights under the licenses
- **Source code availability.** Providing source code for original work, for combined work or modifications, as well as build scripts (scripts that control the build process)

These obligations may trigger upon key events, such as:

- External distribution
- Whether you have made modifications

This slide expands on what compliance obligations must be satisfied in typical FOSS licenses.

FOSS Conditions & Restrictions

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Depending on the FOSS license used, you may need to comply with one or more of the following types of conditions and restrictions:

- Retain copyright (and other) notices
- Provide a copy of the license
- Provide notice of modifications
- Modified versions must have a different name to avoid confusion
- Provide access to source code (whether you modified it or not)
- Maintain modified versions (derivative works) under the same license
- Provide attribution
- Do not use the project or copyright holder name or trademark
- Do not restrict others of the rights granted under the original license
- Termination clauses (if you breach, you lose license)

This slide explains some of the conditions or restrictions commonly encountered when using FOSS licenses. Remember, different licenses have different obligations.

FOSS Compliance Triggers: Distribution

OPENCHAIN

- Dissemination of material to an outside entity
  - Applications downloaded to a user's machine or mobile device
  - JavaScript, web client, or other code that is downloaded to the user's machine
- For some FOSS licenses, access via a computer network can be a "trigger event." The trigger is"users interacting with it remotely through a computer network."
  - Some licenses define the trigger event to include permitting access to software running on a server (e.g., all versions of the Affero GPL if the software is modified)

This slide explains when FOSS obligations are "triggered." FOSS licenses are copyright licenses and the basic compliance trigger is when you distribute code to another legal entity.

FOSS Compliance Triggers: Modification

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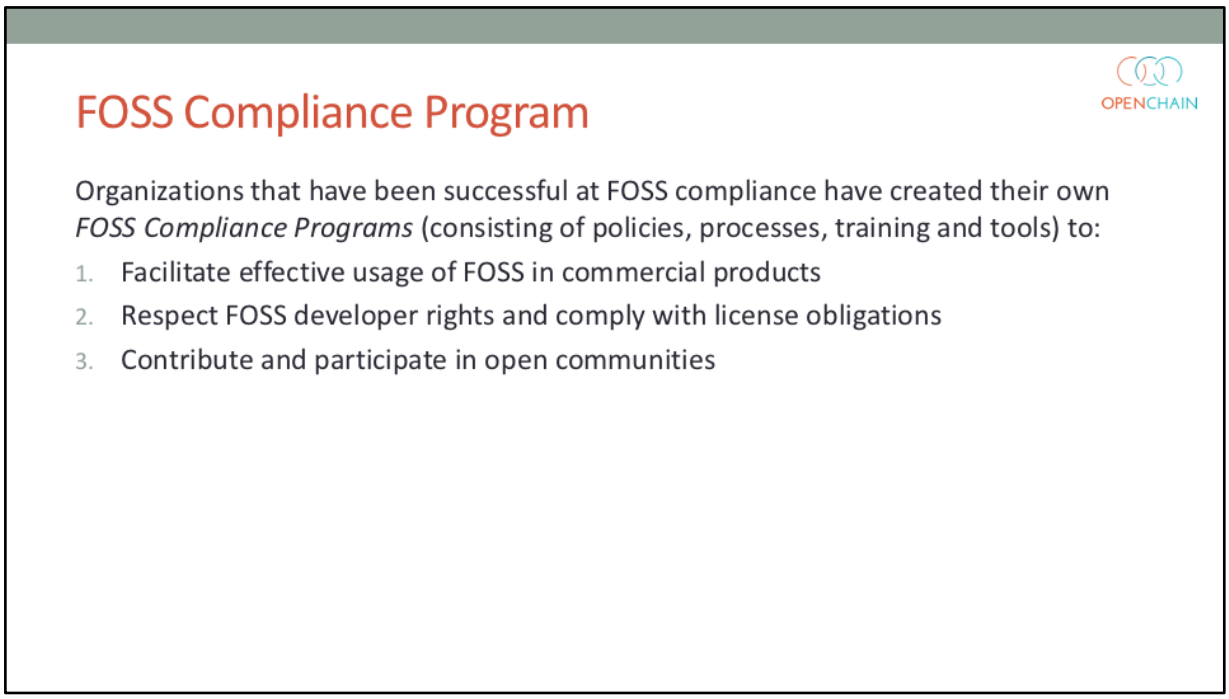
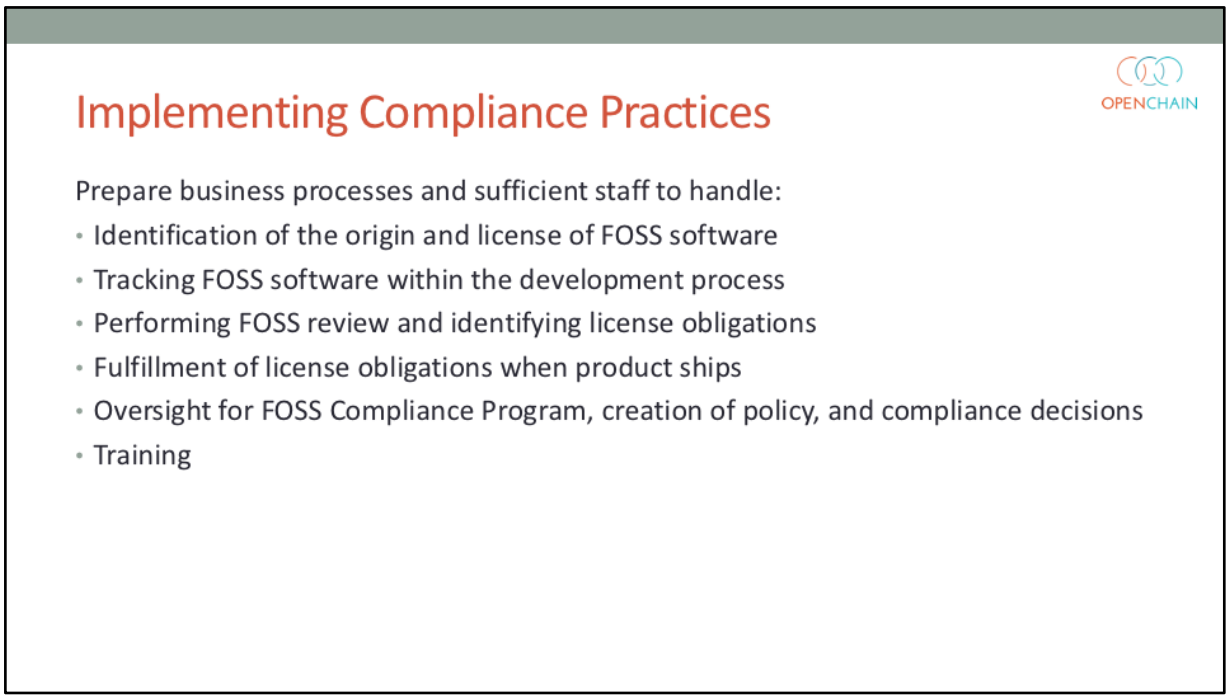
- Changes to the existing program (e.g., additions, deletions of code in a file, combining components together)
- Modifications may constitute a derivative work, and FOSS authors may limit or place obligations on modifications
- Modifications may trigger FOSS obligations, such as:
  - Notice of modification
  - Providing accompanying source code

This slide explains that modifying code can impose obligations under FOSS licenses. It explains a little bit about derivative works.



This slide explains how FOSS compliance programs work in “broad stokes” (a basic overview).



This slide explains more about how FOSS compliance practices can work in an organization.

Compliance Benefits

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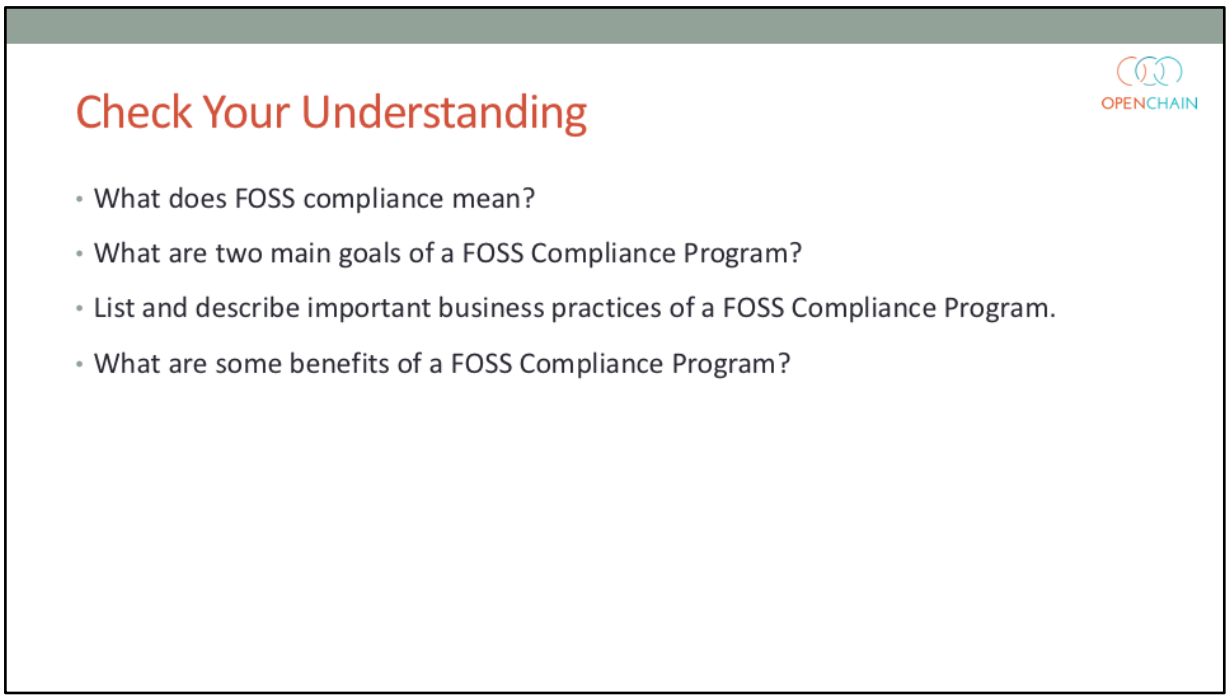
Benefits of a robust FOSS Compliance program include:

- Increased understanding of the benefits of FOSS and how it impacts your organization
- Increased understanding of the costs and risks associated with using FOSS
- Better relations with the FOSS community and FOSS organizations
- Increased knowledge of available FOSS solutions

This slide describes some of the benefits that compliance brings to an organization beyond the fact of fulfilling the legal obligations of the license.



FOSS compliance means following the licensing terms of FOSS licenses. It involves understanding the licenses, having processes to support the license terms, and having processes to address any oversights or errors.

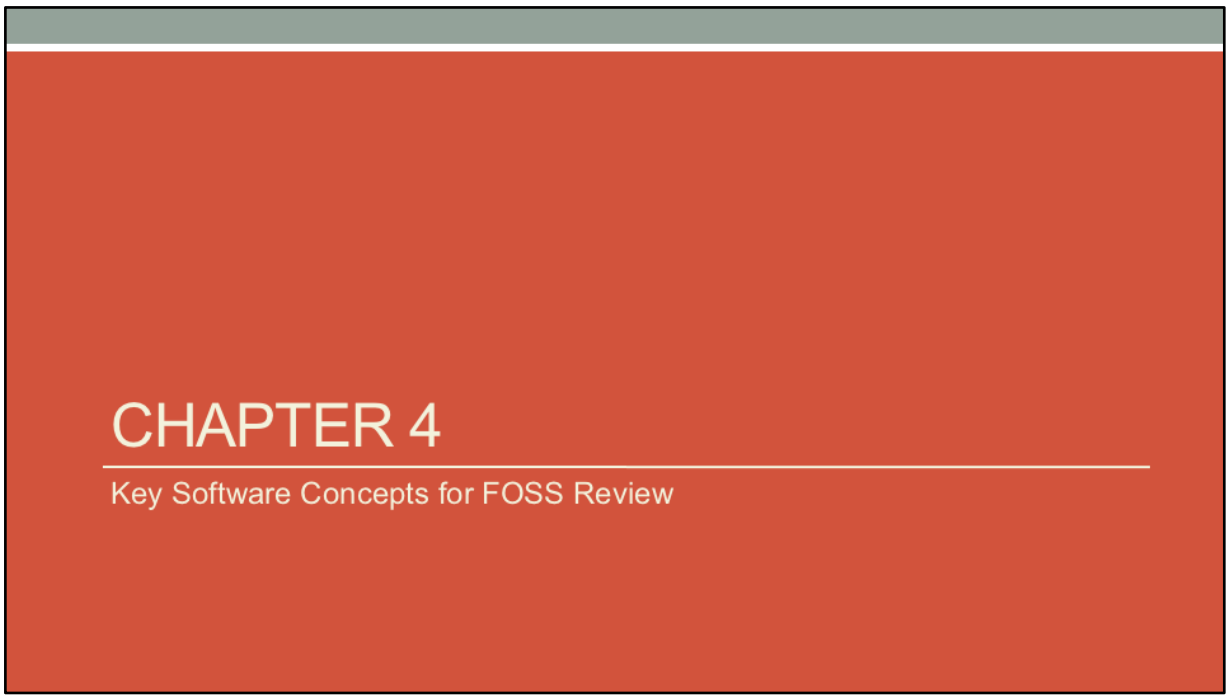
The two main goals of a FOSS compliance program are **know your obligations** and to **satisfy your obligations**.

The important business practices of a FOSS compliance program include:

- Identification of the origin and license of FOSS software
- Tracking FOSS software within the development process
- Performing FOSS review and identifying license obligations
- Fulfillment of license obligations when product ships
- Oversight for FOSS Compliance Program, creation of policy, and compliance decisions
- Training

A FOSS compliance program provides various benefits such as an increased understanding of how FOSS impacts your organization, an increased understanding of the costs and risks associated with FOSS, better relations with the FOSS community

and increased knowledge of available FOSS solutions.



This chapter describes some fundamental concepts in understanding FOSS usage

How do you want to use to the component?

OPENCHAIN

Common scenarios include:

- Incorporation
- Linking
- Modification
- Translation

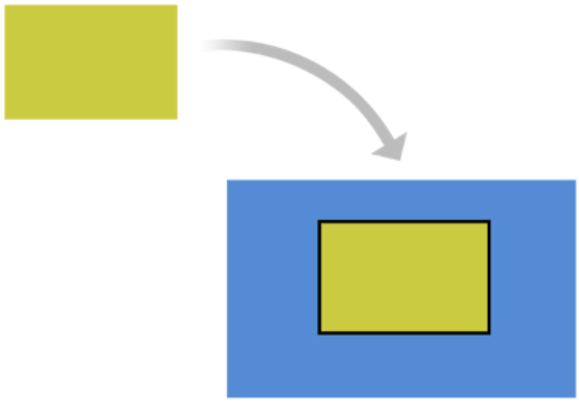
This slide is about how the use of FOSS components is a consideration for your compliance. Different use cases will have different legal effects. The next few slides explain these concepts in more detail.

Incorporation

A developer may copy portions of a FOSS component into your software product.

Relevant terms include:

- Integrating
- Merging
- Pasting
- Adapting
- Inserting



This slides outlines what incorporation means when using FOSS.

Linking

A developer may link or join a FOSS component with your software product.

Relevant terms include:

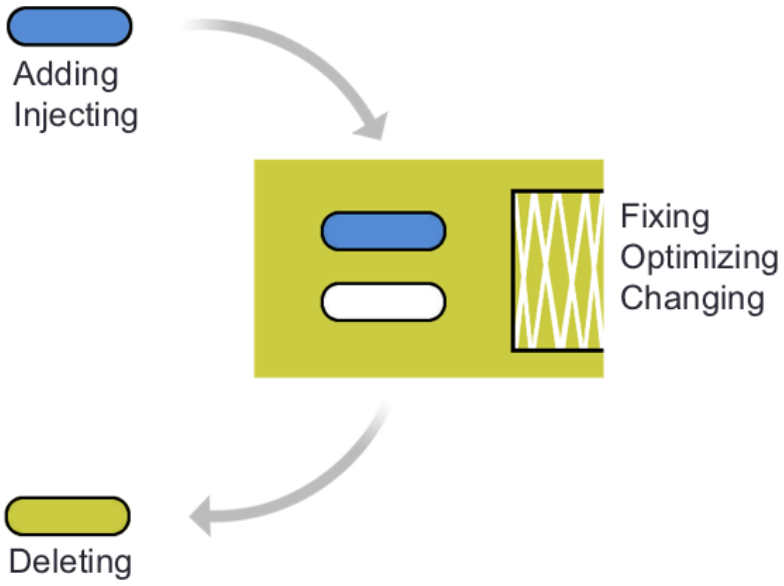
- Static/Dynamic Linking
- Pairing
- Combining
- Utilizing
- Packaging
- Creating interdependency

This slides outlines what linking means when using FOSS.

Modification

A developer may make changes to a FOSS component, including:

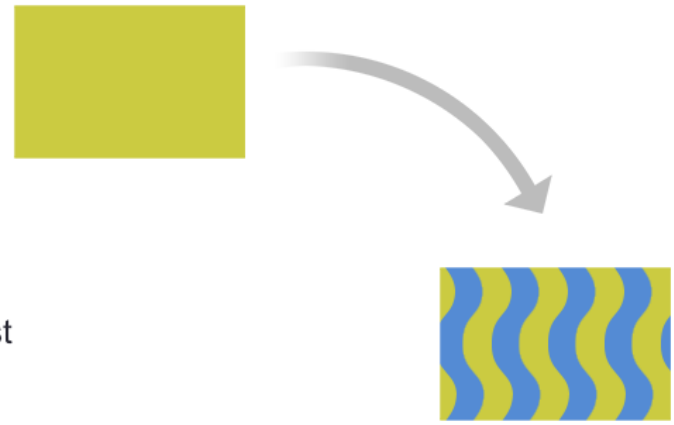
- Adding/injecting new code into the FOSS component
- Fixing, optimizing or making changes to the FOSS component
- Deleting or removing code



This slides outlines what modification means when using FOSS.

Translation

A developer may transform the code from one state to another.



Examples include:

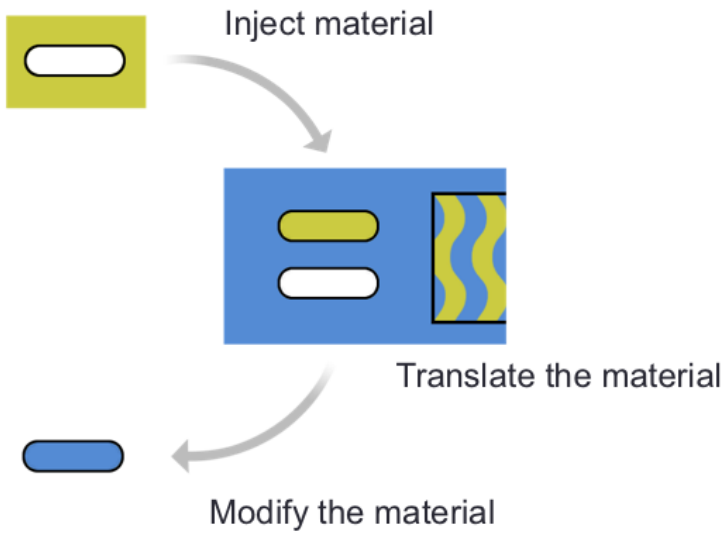
- Translating Chinese to English
- Converting C++ to Java
- Compiling VHDL in a mask or net list
- Compiling into binary

This slides outlines what translation means when using FOSS.

Development Tools

Development tools may perform some of these operations behind the scenes.

For example, a tool may inject portions of its own code into output of the tool.



This slides explains that development tools may do some of these actions "behind the scene", and this is an area that companies should be aware of.

How is the FOSS component distributed?

OPENCHAIN

- Who receives the software?
  - Customer/Partner
  - Community project
- What format for delivery?
  - Source code delivery
  - Binary delivery
  - Pre-loaded onto hardware

This slide explains some of the concepts behind distribution. Because FOSS licenses usually apply during distribution, this is a key point to consider in a compliance program.

Check Your Understanding

- What is incorporation?
- What is linking?
- What is modification?
- What is translation?
- What factors are important in assessing a distribution?

Incorporation is when you copy portions of a FOSS component into your software product.

Linking is when you link or join a FOSS component with your software product.

Modification is when you make changes to a FOSS component.

Translation is when you transform the code from one state to another.

When thinking about distribution of Open Source you should consider to things:
Who receives the software?

- Customer/Partner
- Community project

What is the format for delivery?

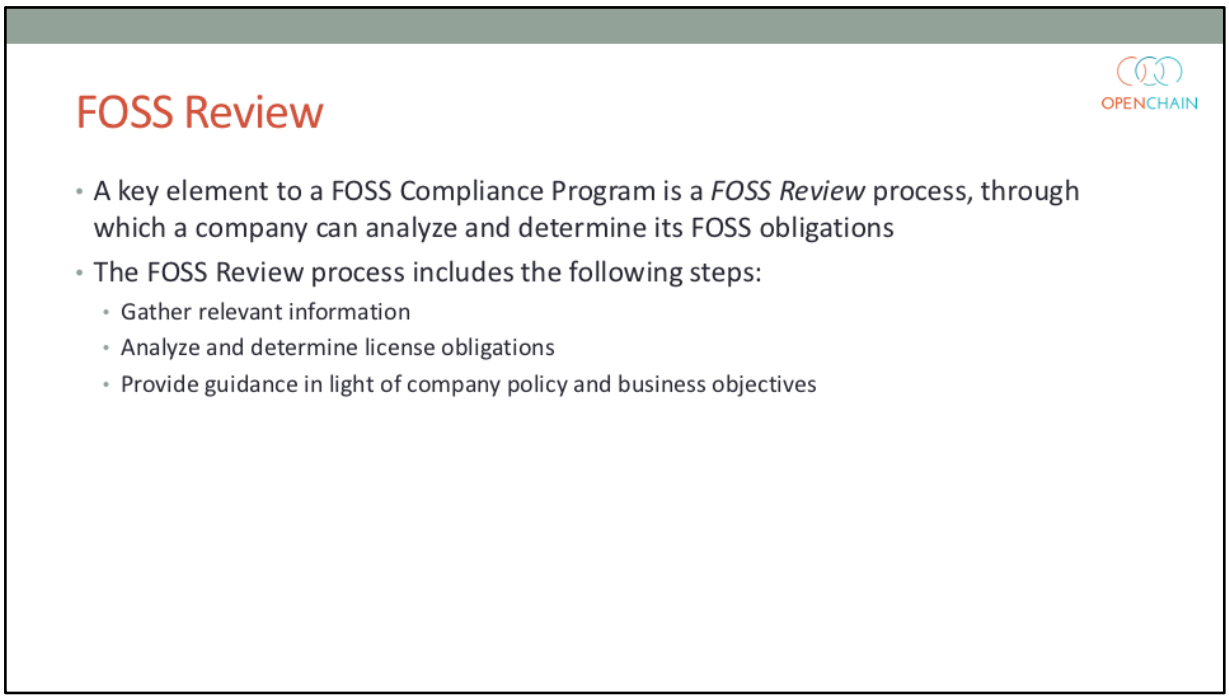
- Source code delivery

- Binary delivery
- Pre-loaded onto hardware

CHAPTER 5

Running a FOSS Review

This chapter describes a “FOSS Review” process in which FOSS usage is analyzed and the relevant obligations are determined



The FOSS Review is a basic building block of a FOSS Compliance Program.

A FOSS Review can be the meeting point for engineering, business and legal teams, and can require planning and organization to successfully conduct on a large scale.

- Engineering or developer teams may participate in gathering relevant information
- Legal teams analyze and determine license obligations and provide guidance
- Business and engineering teams may receive and implement guidance

Initiating a FOSS Review

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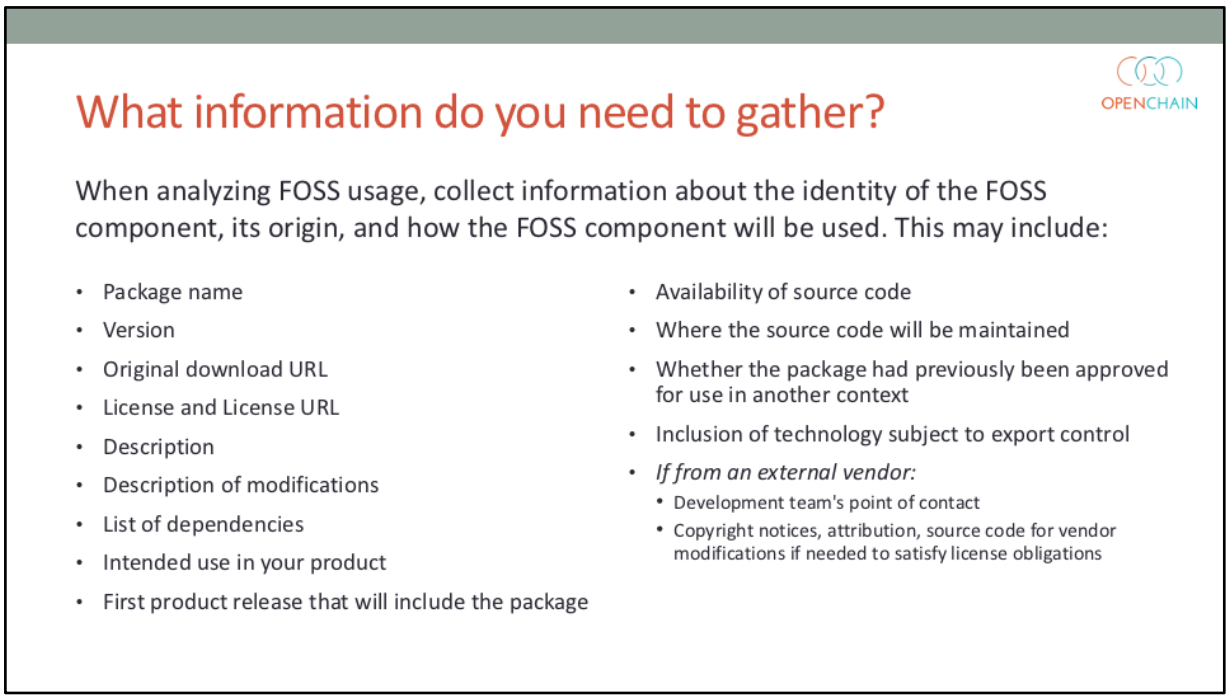
The FOSS Review process should be accessible to Program/Product Managers, Engineers and others who may be working with FOSS.

Note: This process may also start when receiving FOSS-based software from outside vendors.

The first step is to identify the proper parties to initiate a FOSS Review

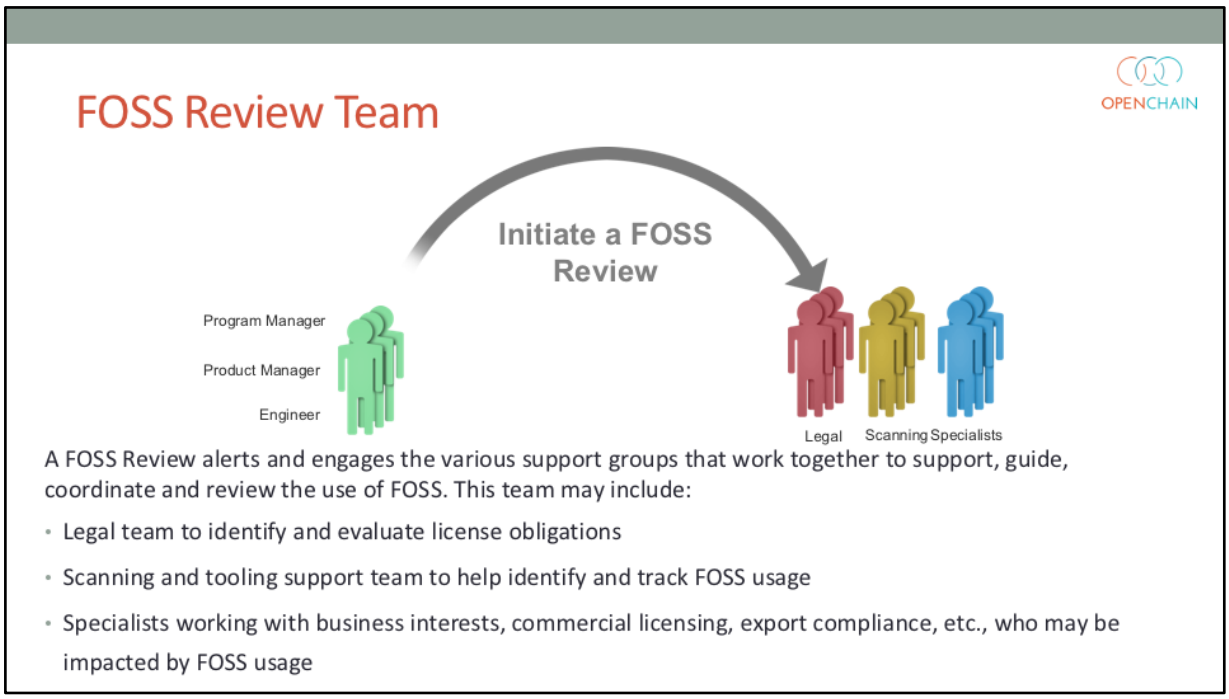
Important questions to ask include:

- Who are the decision makers about FOSS usage (managers, architects, individual engineers, etc.)?
- How can they raise questions about FOSS usage?
- Is there a regular point in your development process where FOSS Reviews can begin?



It should be noted that this list of information looks quite large. However, the amount of information required depends on the size of your company and what you intend to do with the FOSS code. Large entities tend to require more information than small entities.

There are a couple additional issues in the case of external vendors. First, you may need to follow up with the vendor if FOSS issues arise in the future, and having a reliable point of contact is important. You may also need to meet FOSS license obligations for FOSS delivered from the vendor. Ensure you have the notices and source code as needed to meet these obligations.



The FOSS Review team may consist of an interdisciplinary team

The legal team, which may include in-house or outside attorneys, reviews and evaluates the FOSS usage for license obligations

The legal team may be supported by others, including:

- Scanning and tooling teams that identify and track FOSS usage. These teams may provide support using code scanning or forensics tools to identify FOSS components in a codebase. The teams may also organize and track information gathered regarding FOSS usage to assist with later compliance processes.
- Other specialists or representatives that may be impacted by FOSS-related issues, such as commercial licensing, compliance or business planning teams.

Analyzing Proposed FOSS Usage

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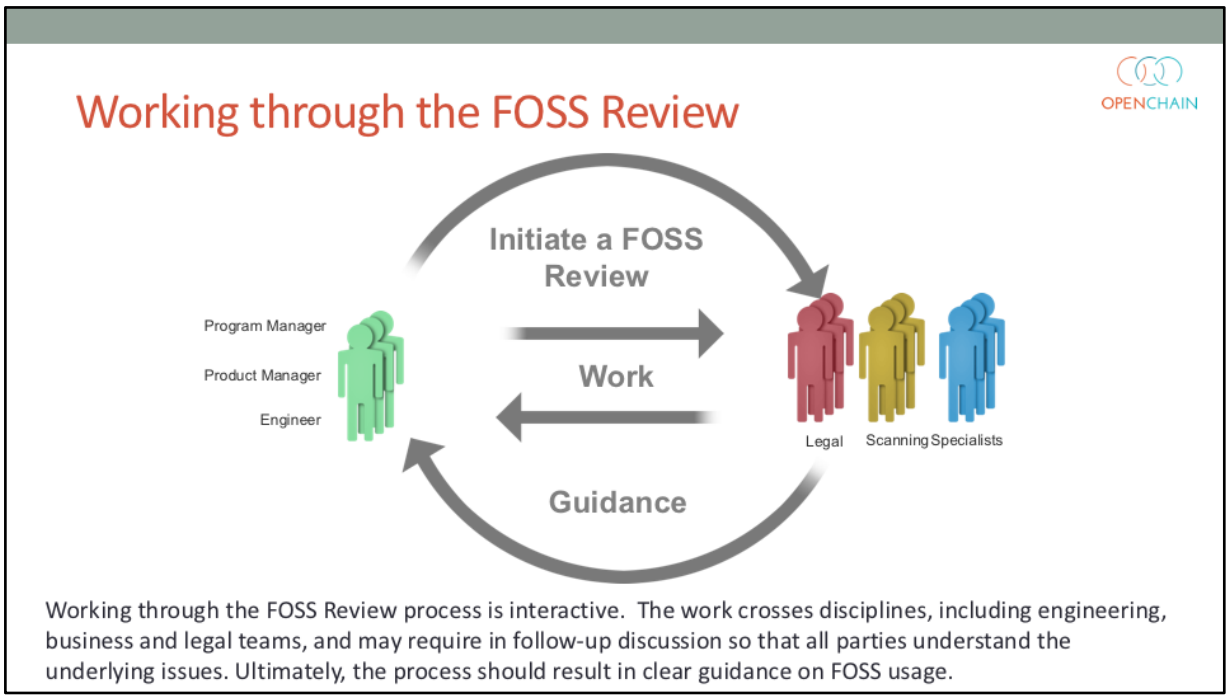
The FOSS Review team should assess the information it has gathered before providing guidance, including for issues such as:

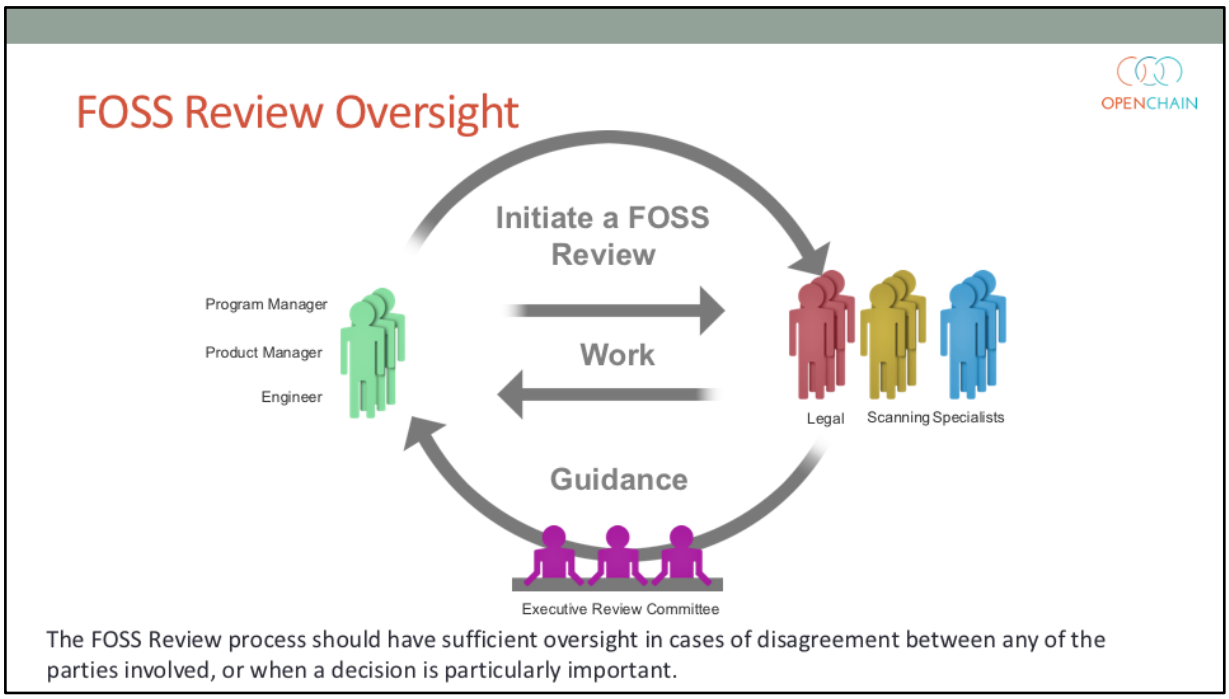
- Completeness, consistency, accuracy (code scanning tools may be used to scan for undisclosed FOSS usage)
- Does the declared license match what is in the code files?
- Does the license truly permit the proposed use of the software?

The FOSS Review team should have the expertise to properly assess the FOSS usage. This may require support from engineering teams to educate legal and business teams about the proposed FOSS usage. For example, code scanning may be used to locate undisclosed FOSS usage.

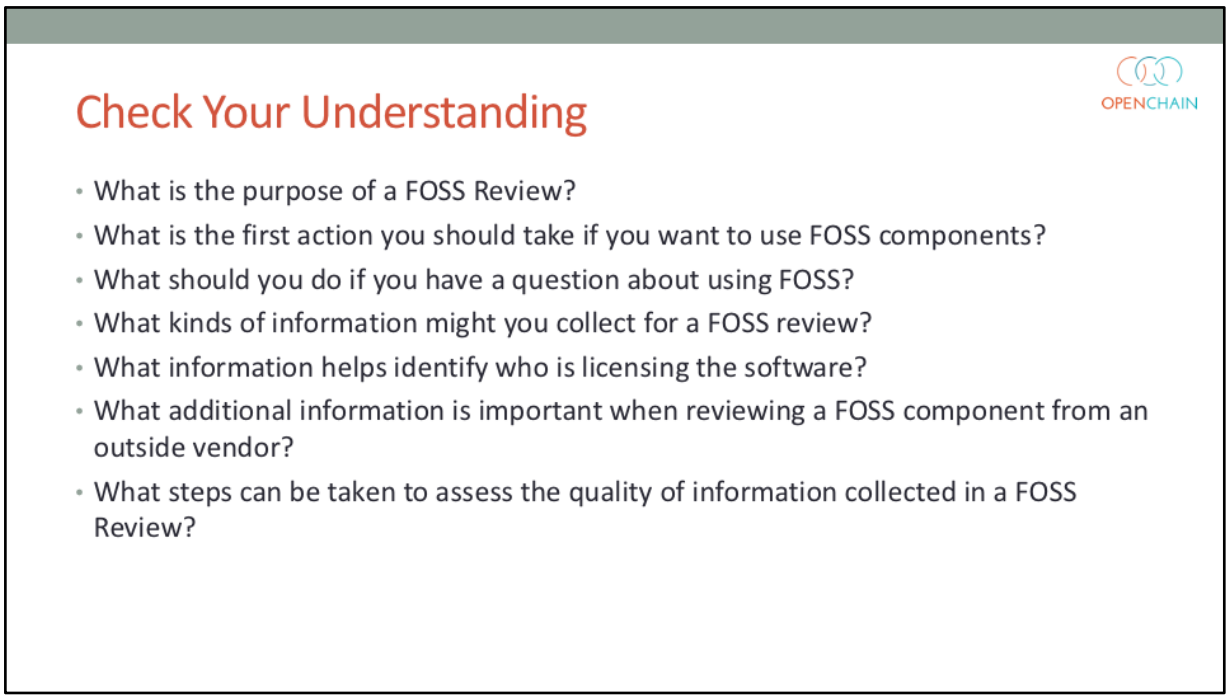
Once the proposed FOSS usage has been fully assessed, the legal team will then have the necessary information on which to make its judgments.



The FOSS Review process should be flexible enough to allow the interested parties to collaborate. Sometimes a FOSS usage scenario may not be clear to the FOSS review team. The engineering team will need the ability to provide further input. Likewise, the engineering team may need assistance in implementing guidance from the FOSS review team.



The FOSS Review process should have oversight (for example, an Executive Review Committee in this diagram). The oversight committee may make important policy decisions or resolve disagreements between parties in the review process.



To gather and analyze information regarding FOSS usage and to produce appropriate guidance.

Initiate a FOSS review process. The method for initiating this process may vary by company, but should be open to those who are involved in using FOSS in development.

Initiate a FOSS review process or contact the FOSS review team. The process should be flexible enough so that FOSS users in your organization have access to guidance.

The package name, version, download URL, license, description and intended use in your product is a good starting point. The precisely level of detail you will need depends on your organization and intended use case.

The copyright notices, attribution and source code normally helps to identify who is licensing the FOSS software.

Development team's point of contact in case you need to follow up with future FOSS issues. You may also want to obtain copyright and attribution notices, and source

code for vendor modifications if these are needed to satisfy license obligations for FOSS licenses governing the third party software.

Check information for completeness, consistency and accuracy. This process may be assisted by support teams, including teams that run code scanning tools to scan for undisclosed FOSS usage.

CHAPTER 6

End to End Compliance Management (Example Process)

This chapter contains an example of a detailed end to end compliance management process.

Introduction

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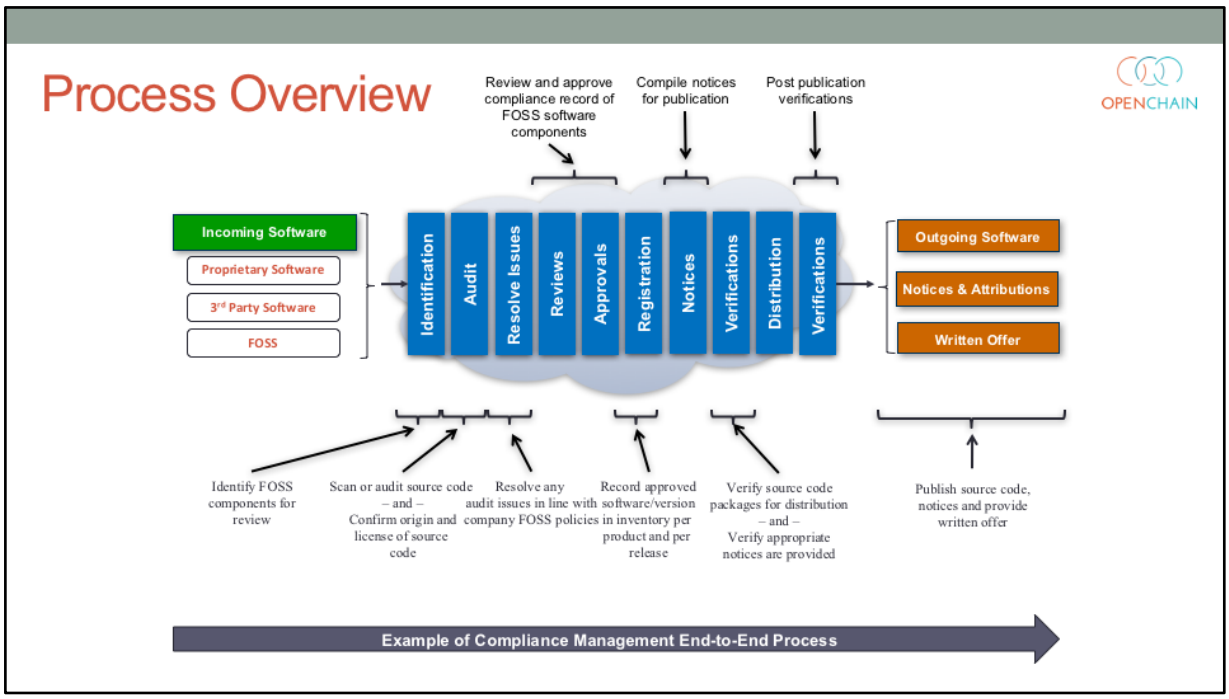
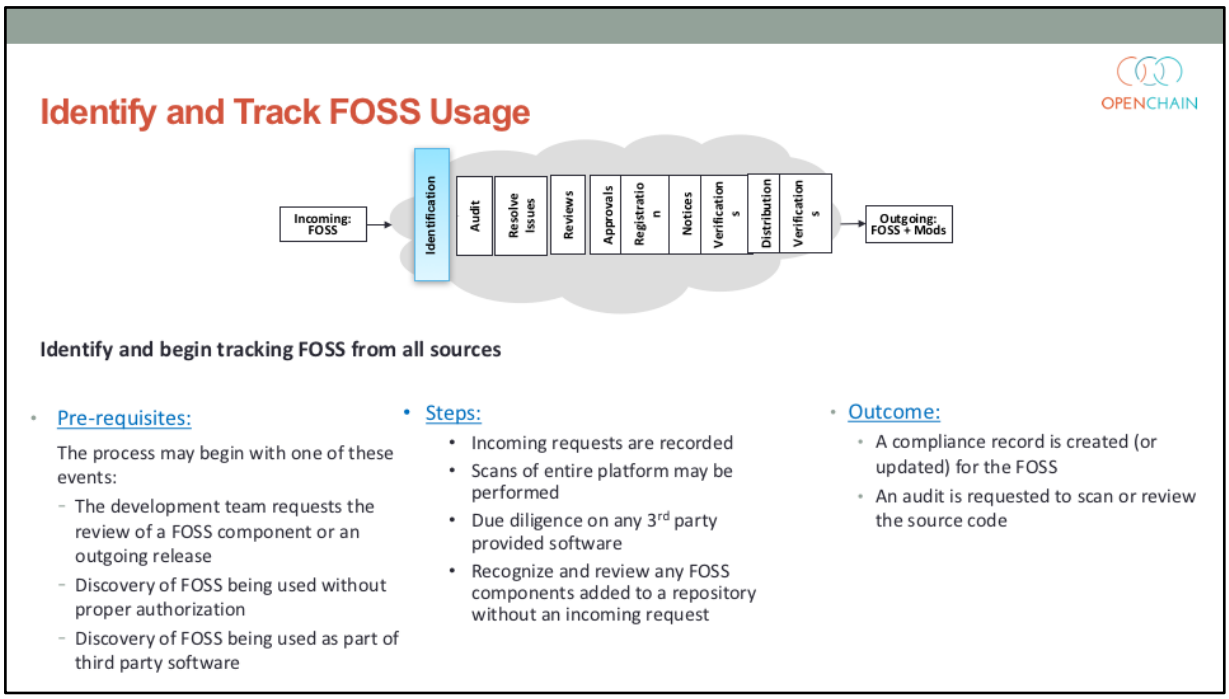
- Compliance management consists of a set of actions that controls the intake and distribution of FOSS used in products (or "Supplied Software" in the OpenChain specification)
- The result of compliance due diligence is an identification of all FOSS used in the Supplied Software. It confirms that all FOSS license obligations have been or will be met
- Small companies may just use a checklist while larger enterprises will have a detailed process. This chapter provides an example of an enterprise process.

This slide describes the definition of compliance management and its end goals.

Note that this section provides a detailed example of what may take place in a large enterprise. Smaller companies may wish to approach the process in a more streamlined way.



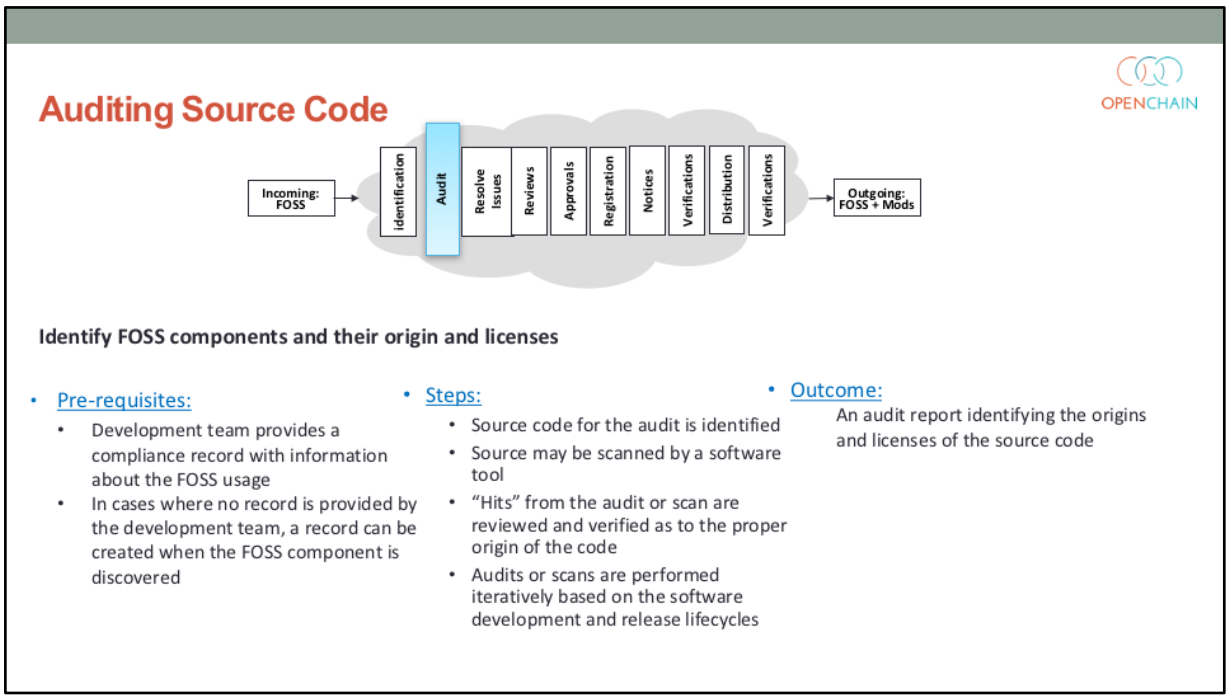
This slide is an overview of the steps that will be described in this chapter.



The first step in our example process is to identify FOSS usage.

This step may have been initiated by one of the events listed in "prerequisites." For example, a development team may have initiated a request (or initiated a FOSS Review). The step may also begin if the review team discovers or is notified that FOSS is being used in a software release or in third party software used by the company, and that a proper review needs to take place.

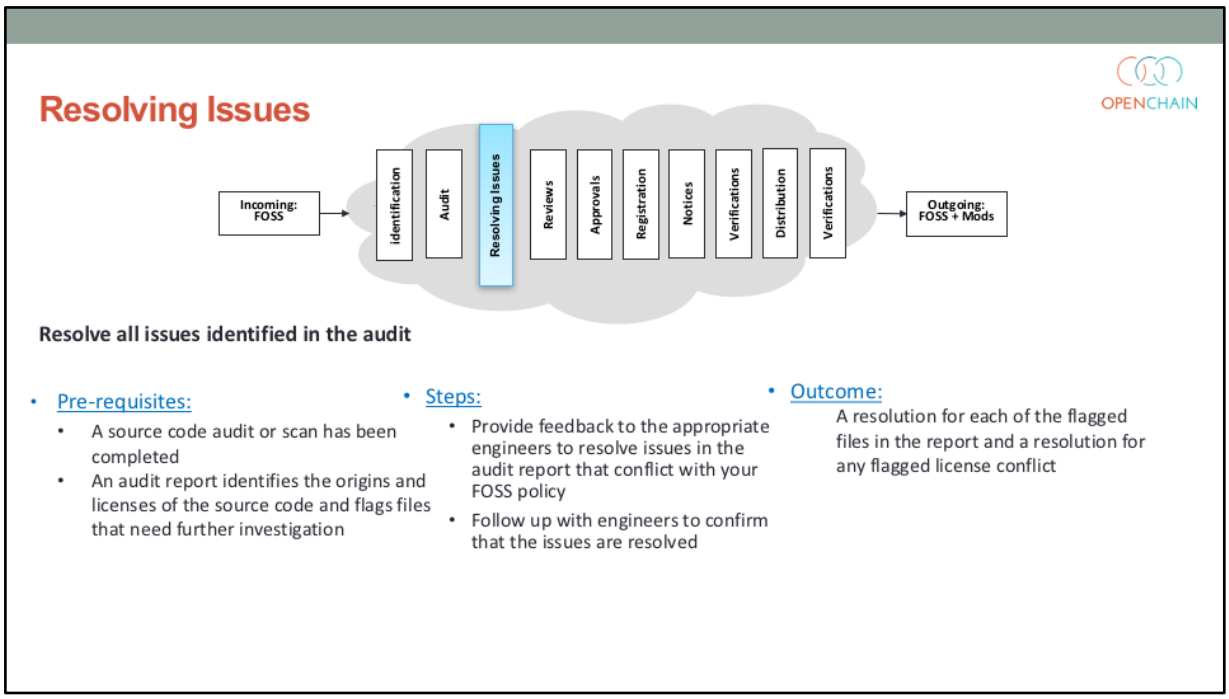
In this example, the FOSS review team may identify FOSS usage through review requests from engineers, from performing scans of internally-developed and third-party software, or reviewing code checked into development branches. The review team will then create a record of the review, then move to the next step ("Audit").



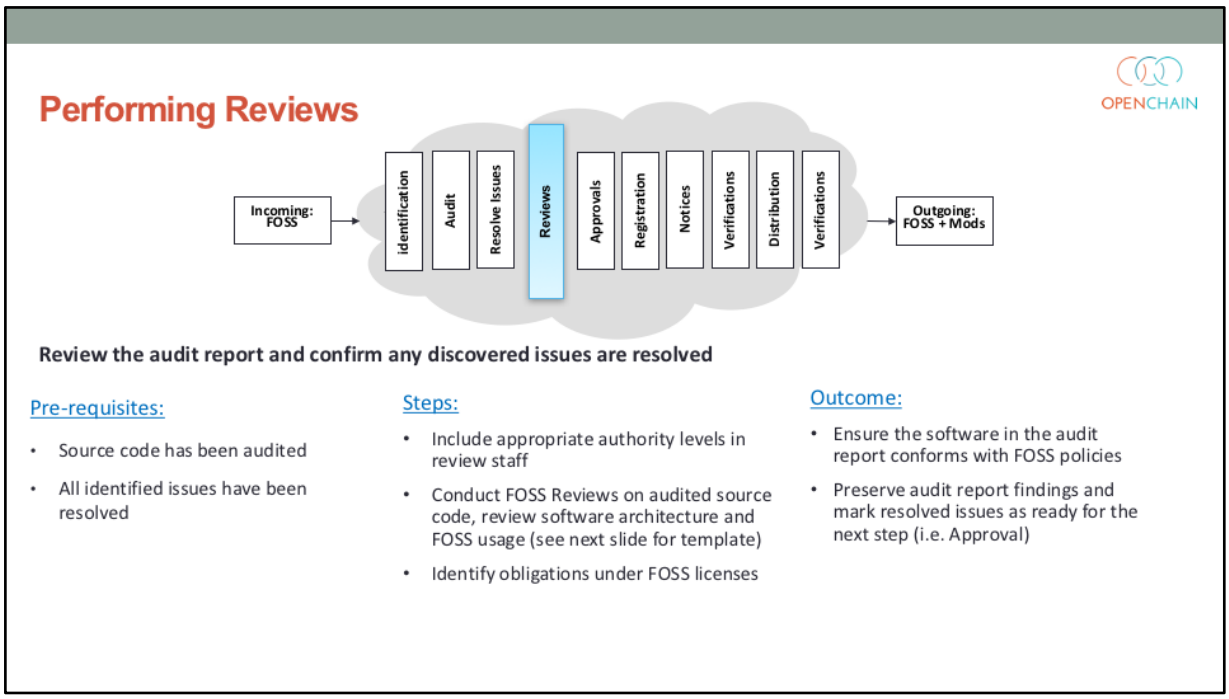
The next step is auditing source code identified in the previous step.

In our example, the company may conduct research into the identified FOSS component (e.g., review declared licenses, research origins of the FOSS component). The company may also scan the source code to verify the origin and composition of the code.

The review team may then produce an audit report with its conclusions regarding the origin and licensing of the source code.



Once an audit report is produced that confirms the origin and licensing of source code, the review team should flag and review any issues under the company FOSS policy. For example, the earlier steps may have identified a FOSS component that contains other FOSS code under an incompatible license. The review team should provide appropriate feedback to the engineering team to resolve the issues.



In this step, the FOSS review team reviews the facts collected in the previous steps and identifies the company's obligations under the FOSS licenses.

This step may be closely linked with the previous step (Resolving Audit Issues). In the previous step we removed FOSS usage that did not conform to company policy. In this step, we evaluate and identify the license obligations for FOSS usage that is retained.

Architecture Review (Example Template)

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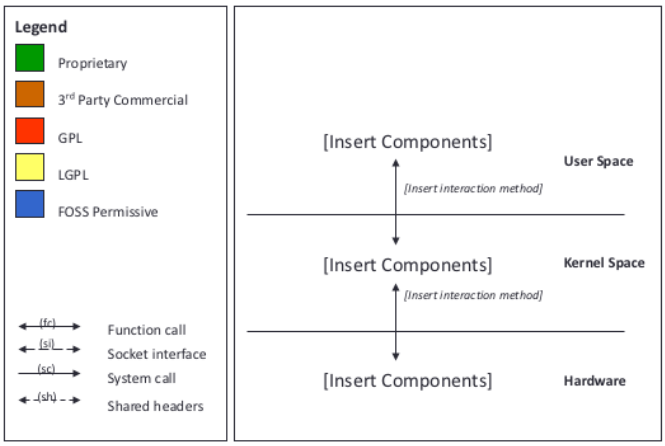

This slide contains a template that may be used to illustrate FOSS usage and its relationship with company software. For example, how are FOSS and company components linked together? Templates such as these may be created by engineering teams to help educate the FOSS review team about planned FOSS usage.

Approvals

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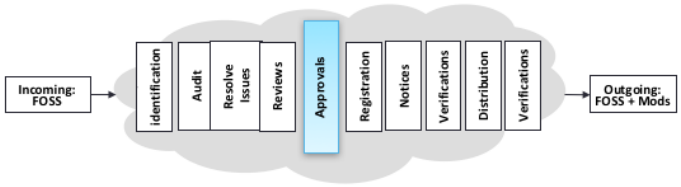
- Based on the results of the software audit and review in previous steps, software may or may not be approved for use
- The approval should specify versions of approved FOSS components, the approved usage model for the component, and any other applicable obligations under the FOSS license
- Approvals should be made at appropriate authority levels



In the approval step of our example process, the review team communicates whether it approves of the FOSS usage in question, along with any associated conditions or obligations. The approval should also include important details such as version numbers of FOSS components and the approved usage scenario.

Registration / Approval Tracking

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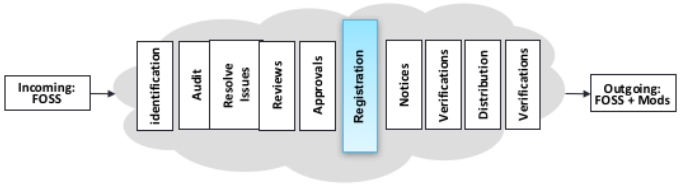
- Once a FOSS component has been approved for usage in a product, it should be added to the software inventory for that product
- The approval and its conditions should be registered in a tracking system
- The tracking system should make it clear that a new approval is needed for a new version of a FOSS component or if a new usage model is proposed



Approval information from the previous step should be tracked or registered so that anyone releasing the software can understand and comply with the relevant license obligations.

Notices

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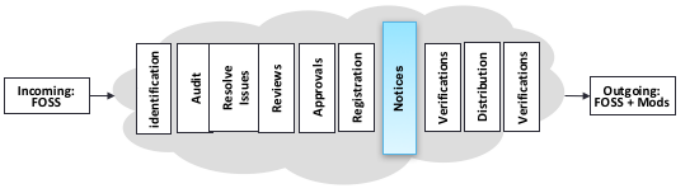

- **Prepare appropriate notices for any FOSS used in a product release:**
  - Acknowledge the use of FOSS by providing full copyright and attribution notices
  - Inform the end user of their product on how to obtain a copy of the FOSS source code (when applicable, for example in the case of GPL and LGPL)
  - Reproduce the entire text of the license agreements for the FOSS code included in the product as needed

If required by a FOSS license, appropriate notices should be prepared (often in a text file that accompanies the release). Notices may include attribution notices, modification notices, or offers for source code. For some licenses, you may also need to include a full copy of the license text.

Pre-Distribution Verifications

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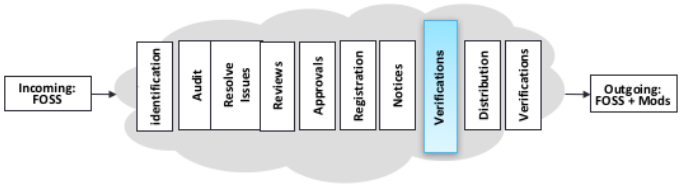


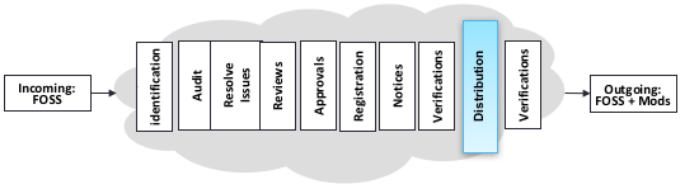
Verify that distributed software has been reviewed and approved

- Pre-requisites:
  - FOSS component has been approved for usage
  - FOSS component has been registered in the software inventory for the release
  - Appropriate notices have been prepared
- Steps:
  - Verify FOSS packages destined for distribution have been identified and approved
  - Verify the reviewed source code matches the binary equivalents shipping in the product
  - Verify all appropriate notices have been included to inform end-users of their right to request source code for identified FOSS
  - Verify compliance with other identified obligations
- Outcome:
  - The distribution package contains only software that has been reviewed and approved
  - "Distributed Compliance Artifacts" (as defined in the OpenChain specification), including appropriate notice files are included in the distribution package or other delivery method

In this slide of our example process, the company verifies that it has met its FOSS license obligations before release. In cases where source code must be made available, the company verifies that the source code matches the binary files being distributed. The company also verifies that notices are properly produced and included in distribution packages as needed.

Accompanying Source Code Distribution

OPENCHAIN



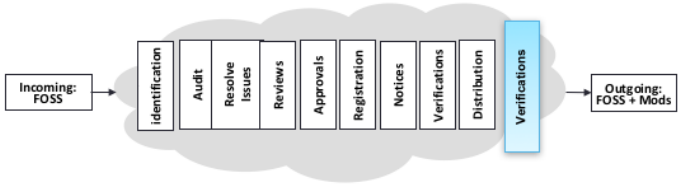
Provide accompanying source code as required

- Pre-requisites:
  - All pre-distribution verification has been completed and no issue is discovered
- Steps:
  - Provide accompanying source code along with any associated build tools and documentation (e.g., by uploading to a distribution website or including in the distribution package)
  - Accompanying source code is identified with labels as to which product and version to which it corresponds
- Outcome:
  - Obligations to provide accompanying source code are met

In cases where source code must be made available, the company provides the accompanying source code through the mechanisms permitted under the FOSS license. This may mean providing the source code along with the software distribution, making it available through a written offer, or posting a source code archive on a website.

Final Verifications

OPENCHAIN



Validate compliance with license obligations

- Pre-requisites:
  - Accompanying source code is provided as may be required
  - Appropriate notices have been prepared
- Steps:
  - Verify accompanying source code (if any) has been uploaded or distributed correctly
  - Verify uploaded or distributed source code corresponds to the same version that was approved
  - Verify notices have been properly published and made available
  - Verify other identified obligations are met
- Outcome:
  - Verified Distributed Compliance Artifacts are appropriately provided

In this step, the company verifies that its distribution complies with its FOSS license obligations. This step could be a function of an entity providing oversight for the overall FOSS review process.

Check Your Understanding

- What is involved in compliance due diligence (for our example process, describe the steps at a high level)?
  - Identification
  - Audit source code
  - Resolving issues
  - Performing reviews
  - Approvals
  - Registration/approval tracking
  - Notices
  - Pre-distribution verifications
  - Accompanying source code distribution
  - Verification
- What does an architecture review look for?

For our example process, the steps include:

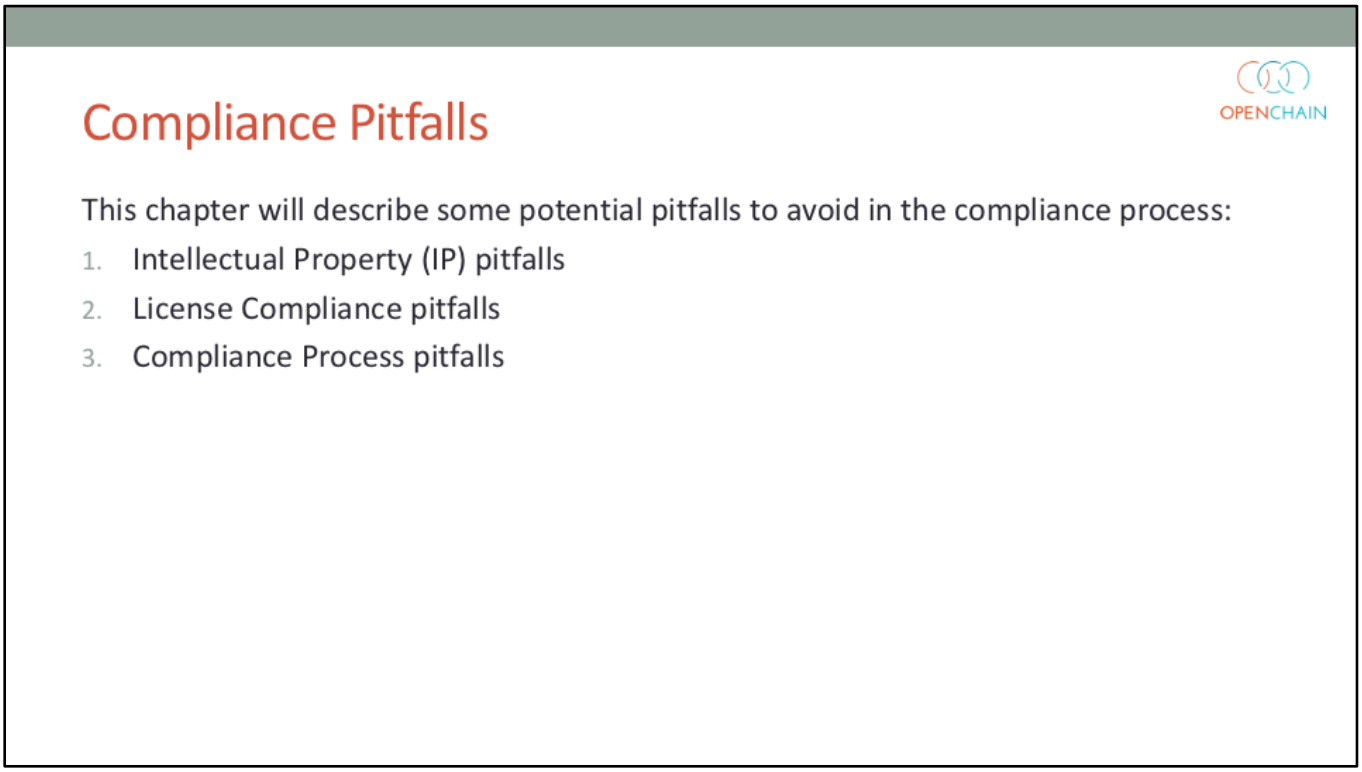
- Identification - Identify and track FOSS usage. This may take place through engineer requests, third party disclosures, or code scanning.
- Auditing source code - Review identified FOSS components for license and origin information.
- Resolving issues - Remove FOSS usage that is incompatible with FOSS policies.
- Performing reviews - Assess and determine obligations for FOSS usage.
- Approvals - Communicate approval conditions and license obligations.
- Registration/approval tracking – Track approval conditions and license obligations for later compliance steps.
- Notices - Prepare notices as required by FOSS licenses.
- Pre-distribution verifications – Review distributions for compliance before release.
- Accompanying Source Code Distribution – Make source code available as needed.
- Verification – Provide oversight for compliance process.

Architecture reviews examine the relationships between FOSS components and company software. For example, how are FOSS and company components linked together?

CHAPTER 7

Avoiding Compliance Pitfalls

This chapter describes some common pitfalls in FOSS compliance processes, and discusses approaches to avoiding these pitfalls



In this chapter, we will describe some common pitfalls to avoid in the FOSS compliance process.

Intellectual Property Pitfalls

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Type & Description	Discovery	Avoidance
Unplanned inclusion of copyleft FOSS into proprietary or 3rd party code: This type of failure occurs during the development process when engineers add (or cut and paste) FOSS code into source code that is proprietary (to you to you or to a third party) in conflict with your FOSS policies.	This type of failure can be discovered by scanning or auditing the source code for possible matches with: • FOSS source code • Copyright notices Automated source code scanning tools may be used for this purpose	This type of failure can be avoided by: • Offering training to engineering staff to bring awareness to compliance issues and to the different types and categories of FOSS licenses and the implications of including FOSS source code in proprietary source code • Conducting regular source code scans or audits for all the source code in the build environment (proprietary, 3rd party and FOSS)

The first pitfall described in this slide arises where copyleft-style licensed FOSS is inadvertently mixed with proprietary code.

This may be discovered through auditing source code for license notices or using code scanning tools.

Preventative measures include training of engineering staff, and building regular audits or scans into the development process.

Intellectual Property Pitfalls

OPENCHAIN

Type & Description	Discovery	Avoidance
Unplanned linking of copyleft FOSS into proprietary source code in certain cases (or vice versa): This type of failure occurs as a result of linking software (FOSS, proprietary, 3rd party) with conflicting or incompatible licenses. The legal effect of linking is subject to debate in the FOSS community.	This type of failure can be discovered using the dependency tracking tool that allows you to discover linkages between different software components.	This type of failure can be avoided by: 1. Offering training to engineering staff to avoid linking software components with licenses that conflict with you FOSS policies which will take a position on these legal risks 2. Continuously running the dependency tracking tool over your build environment
Inclusion of proprietary code into copyleft FOSS through source code modifications	This type of failure can be discovered using the audits or scans to identify and analyze the source code you introduced to the FOSS component.	This type of failures can be avoided by: 1. Offering training to engineering staff 2. Conducting regular code audits

The first pitfall in this slide arises where copyleft-style licensed FOSS is inadvertently linked to proprietary code.

This type of failure may be detected using dependency tracking tools or reviews of architecture.

Preventative measures include training of engineering staff, and building architectural reviews into the development process.

The second pitfall arises where proprietary code is included in copyleft-style licensed FOSS. For example, an engineering team making modifications to a FOSS component may include proprietary code in the modifications.

This type of failure may be discovered through auditing source code introduced into the FOSS component.

Preventative measures include training of engineering staff and building regular audits into the development process.

License Compliance Pitfalls

OPENCHAIN

Type & Description	Avoidance
Failure to Provide Accompanying Source Code	This type of failure can be avoided by making source code capture and publishing a checklist item in the product release cycle before the product becomes available in the market place.
Providing the Incorrect Version of Accompanying Source Code	This type of failure can be avoided by adding a verification step into the compliance process to ensure that the accompanying source code for the binary version is being published.
Failure to Publish Accompanying Source Code for FOSS Component Modifications	This type of failure can be avoided by adding a verification step into the compliance process to ensure that source code for modifications are published, rather than only the original source code for the FOSS component

The first pitfall in this slide arises where a company has an obligation to provide accompanying source code, but fails to do so.

The second pitfall arises where a company provides accompanying source code, but fails to provide the correct version that matches the distributed binary version.

The third pitfall arises where a company modifies a FOSS component, but fails to publish the modified version of the source code. The company instead publishes the source code for the original version of the FOSS component.

In each case, the failures may be prevented by properly applying steps in the compliance process. For example, source code for released binaries should be captured and stored along with the binary version. Verifications prior to release should check to ensure the proper source code is provided with the binary release.

License Compliance Pitfalls

OPENCHAIN

Type & Description	Avoidance
Failure to mark FOSS Source Code Modifications: Failure to mark FOSS source code that has been changed as required by the FOSS license	This type of failure can be avoided by: 1. Adding source code modification marking as a verification step before releasing the source code 2. Offering training to engineering staff to ensure they update copyright markings or license information of all FOSS or proprietary software that is going to be released to the public

The pitfall in this slide arises where a company modifies a FOSS component, then fails to mark its modifications when required by the FOSS license. This pitfall may be prevented through implementing processes for marking code or within verification steps.

Compliance Process Failures

OPENCHAIN

Description	Avoidance	Prevention
Failure by developers to seek approval to use FOSS	This type of failure can be avoided by offering training to Engineering staff on the company's FOSS policies and processes.	This type of failure can be prevented by: 1. Conducting periodic full scan for the software platform to detect any "undeclared" FOSS usage 2. Offering training to engineering staff on the company's FOSS policies and processes 3. Including compliance in the employees performance review
Failure to take the FOSS training	This type of failure can be avoided by ensuring that the completion of the FOSS training is part of the employee's professional development plan and it is monitored for completion as part of the performance review	This type of failure can be prevented by mandating engineering staff to take the FOSS training by a specific date

The pitfalls in this slide arise from a failure to integrate the FOSS compliance process with the engineering team. In these cases, the engineering team does not raise FOSS usage to the review process, or does not receive the training on how to handle FOSS usage.

Preventative measures include monitoring of engineering training, and also making the compliance process easily accessible to the engineering team.

Compliance Process Failures

OPENCHAIN

Description	Avoidance	Prevention
Failure to audit the source code	This type of failure can be avoided by: 1. Conducting periodic source code scans/audits 2. Ensuring that auditing is a milestone in the iterative development process	This type of failure can be prevented by: 1. Providing proper staffing as to not fall behind in schedule 2. Enforcing periodic audits
Failure to resolve the audit findings (analyzing the "hits" reported by a scan tool or audit)	This type of failure can be avoided by not allowing a compliance ticket to be resolved (i.e. closed) if the audit report is not finalized.	This type of failure can be prevented by implementing blocks in approvals in the FOSS compliance process
Failure to seek review of FOSS in a timely manner	This type of failure can be avoided by initiating FOSS Review requests early even if engineering did not yet decide on the adoption of the FOSS source code	This type of failure can be prevented through education

This slide describes potential consequences of compliance process failures. In the first case, a code base may be used in development and releases without proper review. In the second case, FOSS usage may be known, but license obligations are not reviewed or determined. In the last case, the compliance process may face release deadline pressures and have limited time to perform its tasks.

Ensure Compliance Prior to Product Shipment

OPENCHAIN

- Companies must make compliance a priority before any product (in whatever form) ships
- Prioritizing compliance promotes:
  - More effective use of FOSS within your organization
  - Better relations with the FOSS community and FOSS organizations

While avoiding the pitfalls described in this chapter may take resources and effort, prioritizing the FOSS compliance process is important. It can help you more effectively use FOSS in your development process, and also help maintain good working relationships within the FOSS community.

Establishing Community Relationships

OPENCHAIN

As a company that uses FOSS in commercial product, it is best to create and maintain a good relationship with the FOSS community, in particular, the specific communities related to the FOSS projects you use and deploy in your commercial product.

In addition, good relationships with FOSS organizations can be very helpful in advising on best way to be compliant and also help out if you experience a compliance issue.

Good relationships with the software communities may also be helpful for two-way communication: upstreaming improvements and getting support from the software developers.

Your FOSS compliance process is a building block to establishing good working relationships within the FOSS community.

Check Your Understanding

- What types of pitfalls can occur in FOSS compliance?
- Give an example of an intellectual property failure.
- Give an example of a license compliance failure.
- Give an example of an compliance process failure.
- What are the benefits of prioritizing compliance?
- What are the benefits of maintaining a good community relationship?

Pitfalls can occur under the following categories: IP failure, license compliance failure, and compliance process failure.

An example of IP failure would be commingling of proprietary code and open source code, which may result in making proprietary software available to general public despite company's preference.

An example of license compliance failure would be a failure to mark an open source software after modification or to properly list the open source software components in the software or to make the complete and corresponding source code available.

An example of compliance process failure would be a failure in the process related to audit, review, or approving the open source software. Auditors "waived" all the red-flagged items in a report, or that the review and approval process takes too long.

The benefits of prioritizing compliance are that you become more efficient in your use of FOSS, and that you build a better relationship with the open source community.

The benefits of maintaining a good community relationship are that you can better

assess how you can comply with the FOSS license requirements, and you have a better two-way communication with regard to contribution and use of the FOSS.