

# Open Source Software

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**COSS C01**

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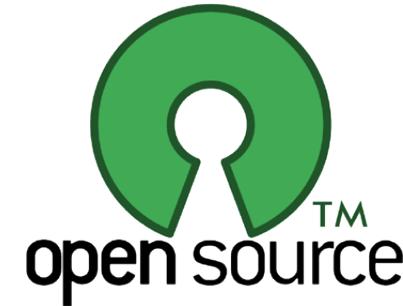
# Agenda

1. Legal definition (open source software)
2. A (very) short history
3. Open source licenses
4. Open source license compliance
5. Open source governance
6. Problems with using open source
7. Open source control mechanisms

# 1. What is Open Source Software?

# Legal Definition of Free and Open Source Software

- Software is **free software** [1] if
  - The user is granted rights to
    - Use, study, modify, and distribute the software
    - Free of charge and other restrictions
- Managed by the Free Software Foundation
- Software is **open source software** [2] if
  - The user is granted rights to
    - Use, modify, and distribute the software
    - Free of charge and other restrictions
- Managed by the Open Source Initiative



- For all practical purposes, free and open source software are the same

[1] See <https://www.gnu.org/philosophy/free-sw.html.en>

[2] See <https://opensource.org/osd>

# Open Source Terminology

- Open source software
  - Is software owned by a large number of contributors
    - Who all individually own the copyright to their contributions
- Open source (software) project [1]
  - Is an open source software + associated community that
    - Has no formal organizational backing but rather relies on individual people
- Open source (software) product
  - Is a commercial product utilizing an open source strategy

[1] Not a project in a traditional sense; no end date set

# Example Open Source Software



debian

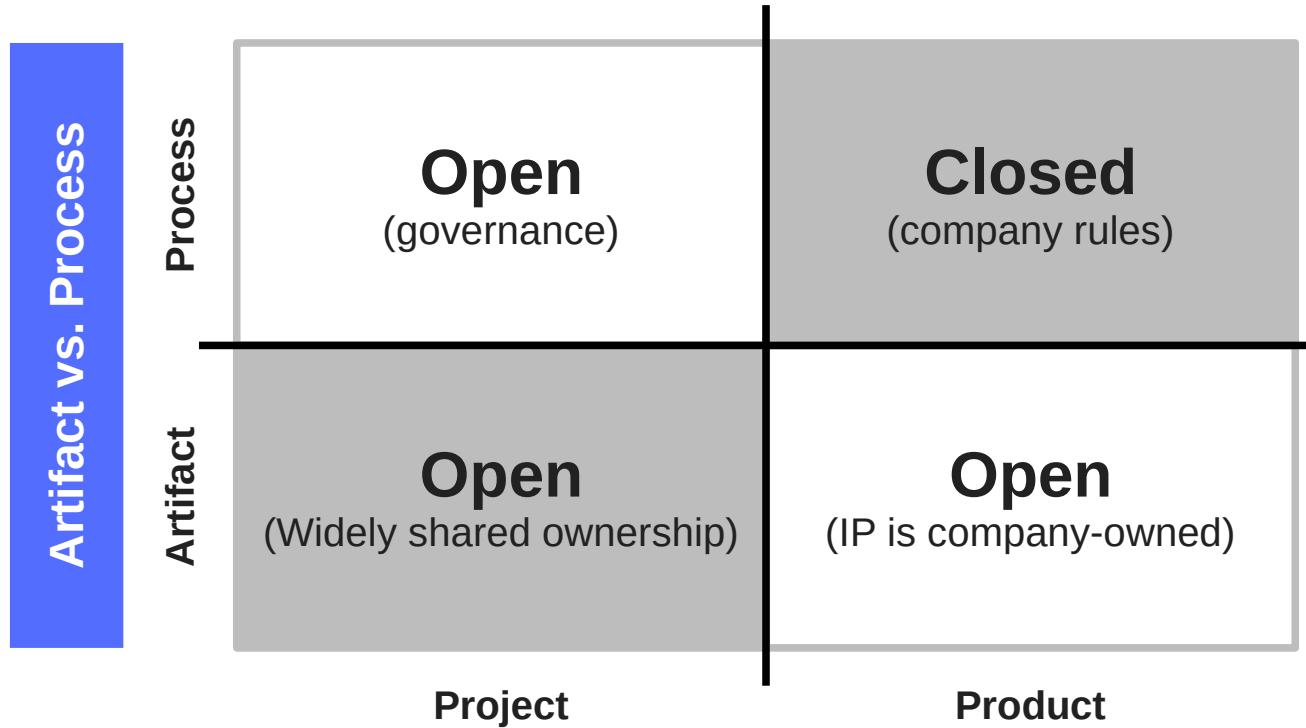


## 2. A (Very) Short History

# Short History of Open Source

- 1960-1979: Not-born-yet (the first era) [LT02]
  - Little or no recognition of software as intellectual property
  - Free sharing of source code, allowing for rapid diffusion and innovation
- 1980-1989: Philosophy (the second era)
  - Founding of the Free Software Foundation by Richard Stallman in 1985
  - Invention of GNU public license for “freeing software”
- 1990-1999: Pragmatism (the third era)
  - Founding of Open Source Initiative in 1998, increased pragmatism
  - Start of growth in number of projects as well as open source licenses
- 2000-2009: Professionalization (the fourth era)
  - Professionalization of open source, away from pure volunteerism
  - Increased focus on commercialization
- 2010-today: Mainstream (the current era)
  - Continued strong growth, simplified access, improved tooling
  - Open source as an on-ramp to the cloud

# Community vs. Commercial Open Source



**Project vs. Product**

# Community vs. Commercial Open Source 2 / 2

- Community open source
  - Traditional open source projects (e.g. GIMP)
  - Developer-led projects / foundations (e.g. Jakarta / Eclipse)
  - User-led projects / foundations (e.g. Kuali)
- Commercial open source
  - Single-vendor open source firms (e.g. MongoDB)
  - Open source distributor firms (e.g. SUSE)
  - Service and support firms (e.g. Cygnus Solutions)

# 3. Open Source Licenses

# Anatomy of Open Source Licenses

## 1. Copyright notice

- The name of the owner and when this work was created and updated

## 2. Rights grant

- The rights granted to a user if they fulfill obligations matching the use-case

## 3. Obligations to fulfill

- A set of obligations (requirements) before the rights grant becomes valid

## 4. Prohibitions (none in the MIT license)

- A set of things the user is prohibited from

## 5. Disclaimer

- The usual disclaimer of warranties, guarantees, etc.

# The MIT License (Template)

1

Copyright <YEAR> <COPYRIGHT HOLDER>

2

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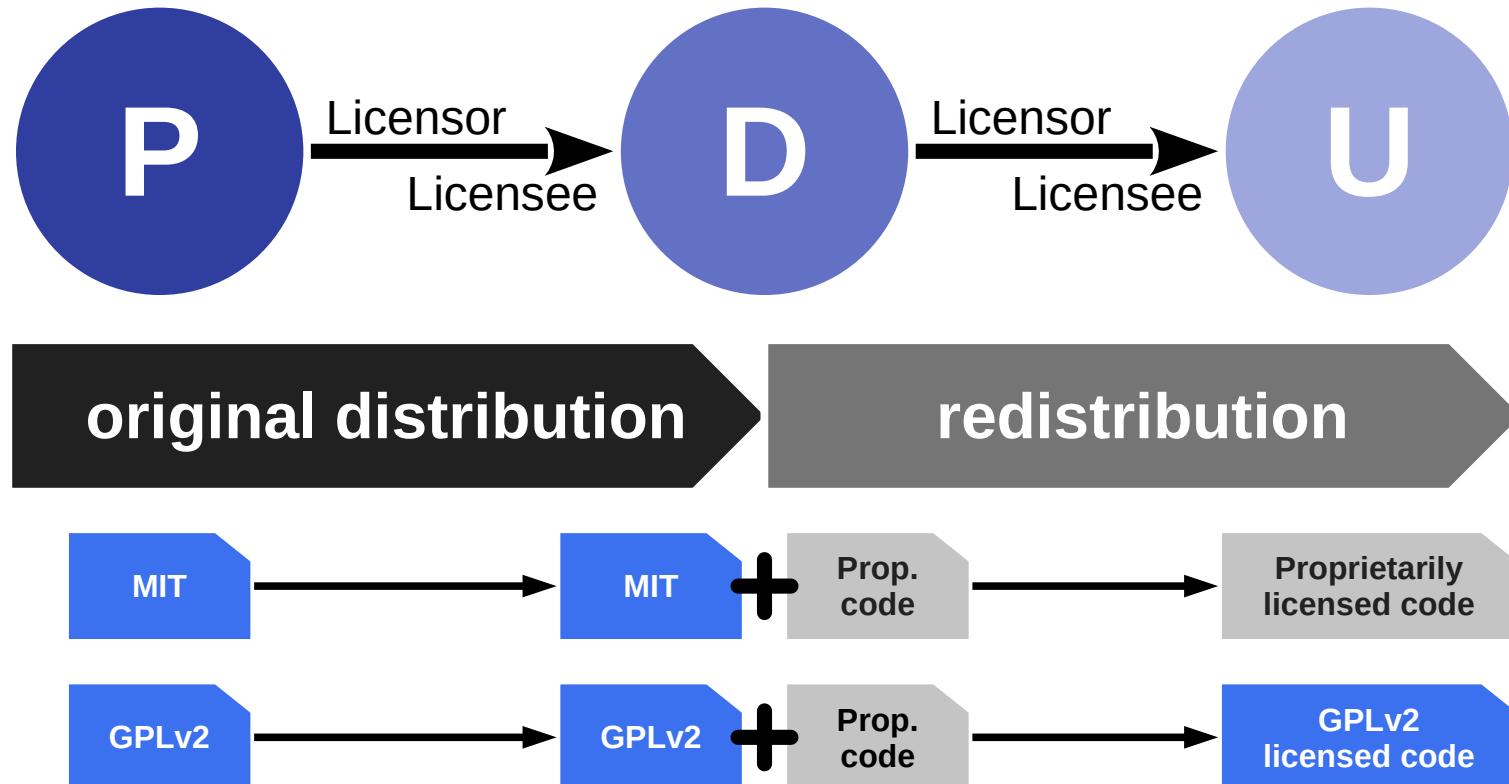
# The Main Use-Cases of Open Source Software

- **In-house use** (everything where you do not pass on code)
  - Personal use
  - Demos to customers
  - Software development tools
- **Distribution** (where you pass on binary or source code)

# The Most Common Obligations for the Distribution Use-Case

- Legal notices
  - Provide attribution
  - Provide license text
  - Provide disclaimers
- Copyleft
  - Propagate license

# Distribution and Rights Propagation



P = Original open source programmer  
D = Distributor (e.g. vendor)  
U = User (e.g. customer)

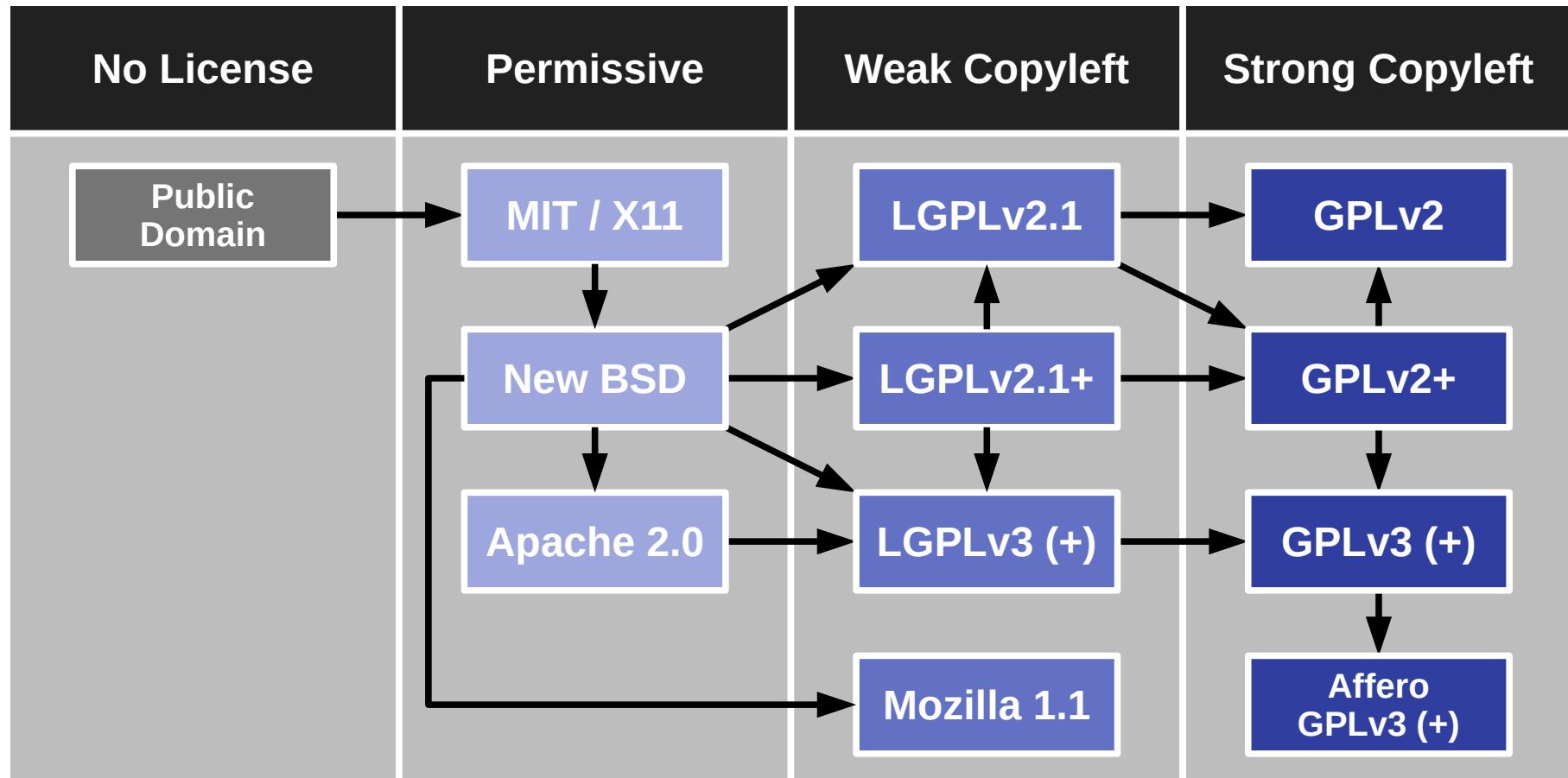
# Types of Licenses by Copyleft Obligation

- Permissive licenses
  - Do not include a copyleft obligation
  - Examples: MIT, BSD-2-Clause, ...
- Weak copyleft licenses
  - Limited use of copyleft obligation
  - Examples: EPL-1.0, LGPL-2.1-or-later, ...
- Strong copyleft licenses
  - Attempted maximum applicability of copyleft obligation
  - Examples: GPL-2.0-only, AGPL-3.0-or-later, ...

# Changes in License Popularity

2009			2019		
#	Name	Market Share	#	Name	Market Share
1	GNU General Public License (GPL) 2.0	52.20%	1	MIT License	32%
2	GNU Lesser General Public License (LGPL) 2.1	9.84%	2	GNU General Public License (GPL) 2.0	18%
3	Artistic License (Perl)	9.01%	3	Apache License 2.0	14%
4	BSD License 2.0	6.27%	4	GNU General Public License (GPL) 3.0	7%
5	GNU General Public License (GPL) 3.0	4.15%	5	BSD License 2.0 (3-clause, New or Revised)	6%
6	Code Project Open 1.02 License	3.59%	6	ISC License	5%
7	Apache License 2.0	3.58%	7	Artistic License (Perl)	4%
8	MIT License	3.32%	8	GNU Lesser General Public License (LGPL) 2.1	4%
9	Mozilla Public License (MPL) 1.1	1.25%	9	GNU Lesser General Public License (LGPL) 3.0	2%
10	Common Public License (CPL)	0.64%	10	Eclipse Public License (EPL)	1%
11	zlib/libpng License	0.51%	11	Microsoft Public License	1%
12	Academic Free License	0.43%	12	Simplified BSD License (BSD)	1%
13	Eclipse Public License (EPL)	0.40%	13	Code Project Open License 1.02	1%
14	Open Software License (OSL)	0.37%	14	Mozilla Public License (MPL) 1.1	<1%
15	GNU Lesser General Public License (LGPL) 3.0	0.37%	15	GNU Affero General Public License 3.0 or later	<1%
16	Mozilla Public License (MPL) 1.0	0.30%	16	Common Development and Distribution License	<1%
17	PHP License Version 3.0	0.28%	17	Do What the F**k You Want To Public License	<1%
18	Ruby License	0.26%	18	Microsoft Reciprocal License	<1%
19	Sun Berkeley License (BSD 2+)	0.18%	19	Sun GPL with Classpath Exception 2.0	<1%
20	Common Development and Distribution License	0.16%	20	zlib/libpng License	<1%

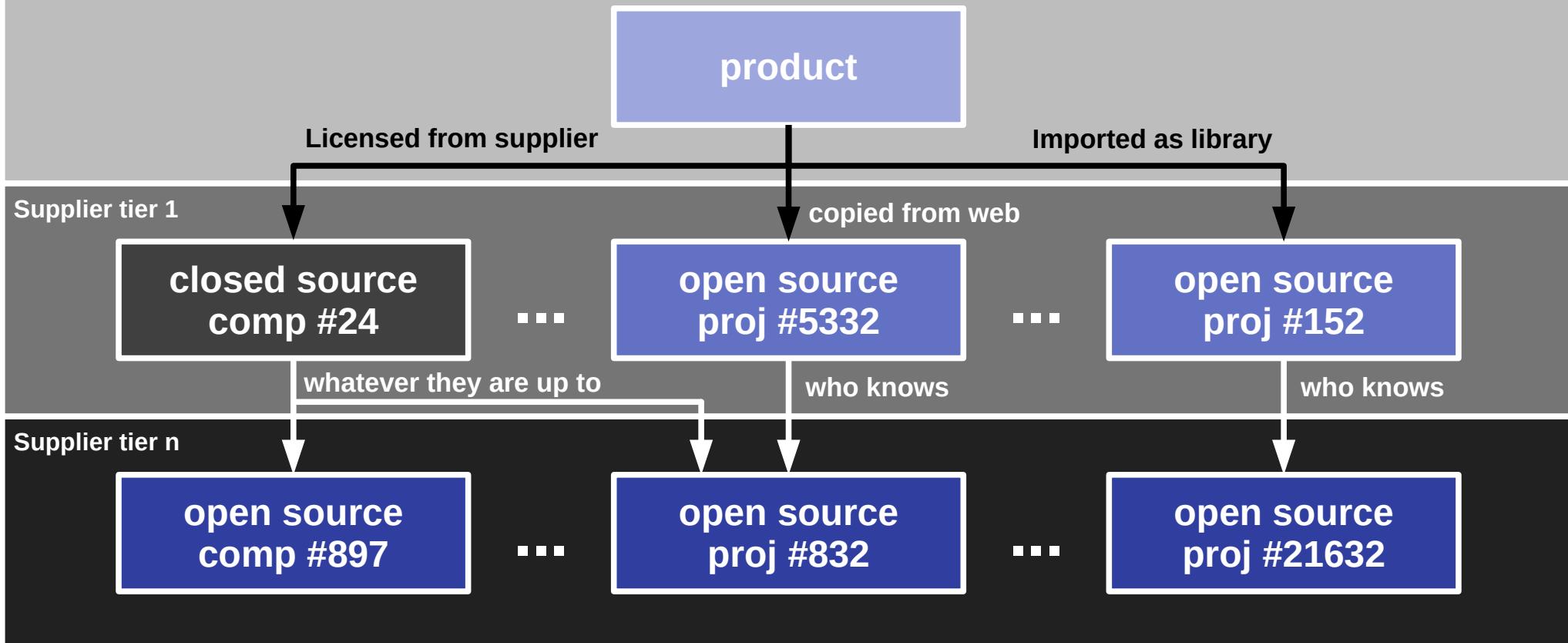
# Open Source License Categories and Families



## 4. Open Source License Compliance

# The Software Supply Chain

Software vendor





[1] <http://www.embedded.it/?q=content/daimler-mercedes-benz-and-open-source-software>

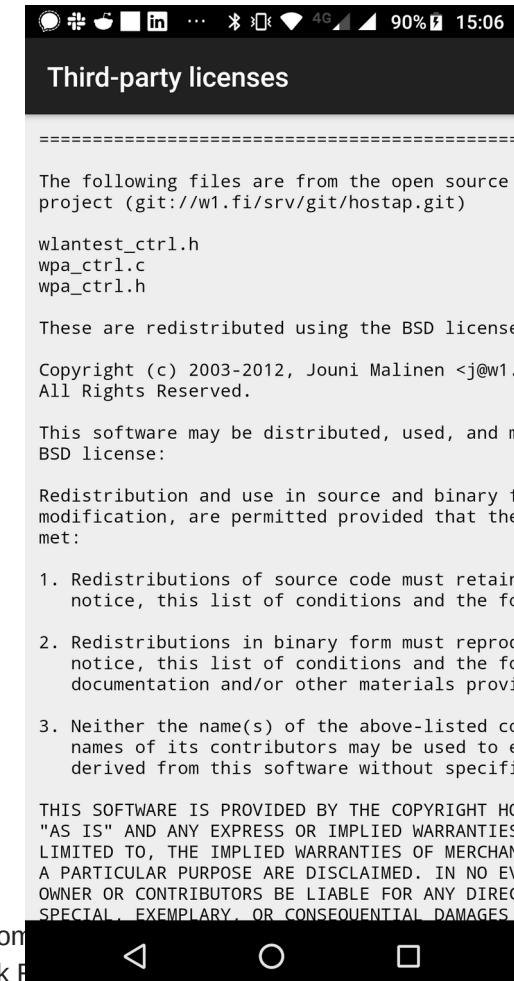
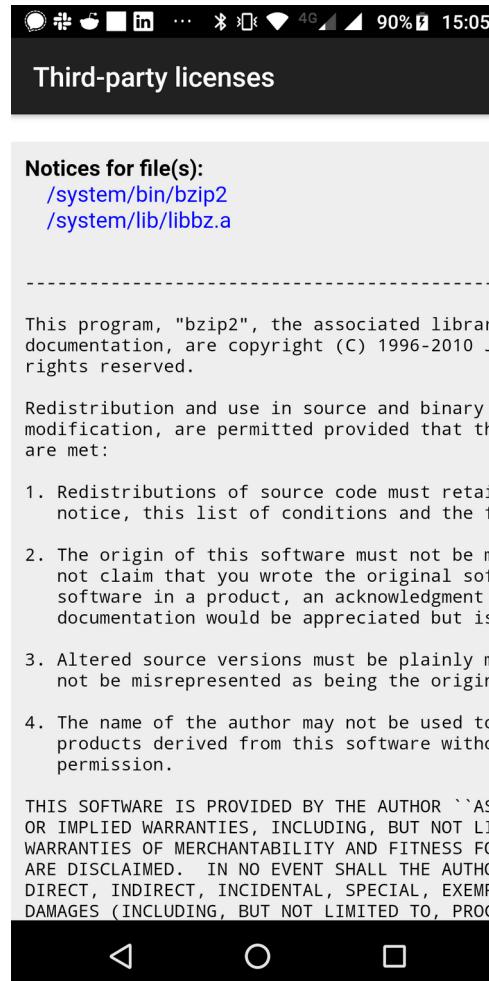
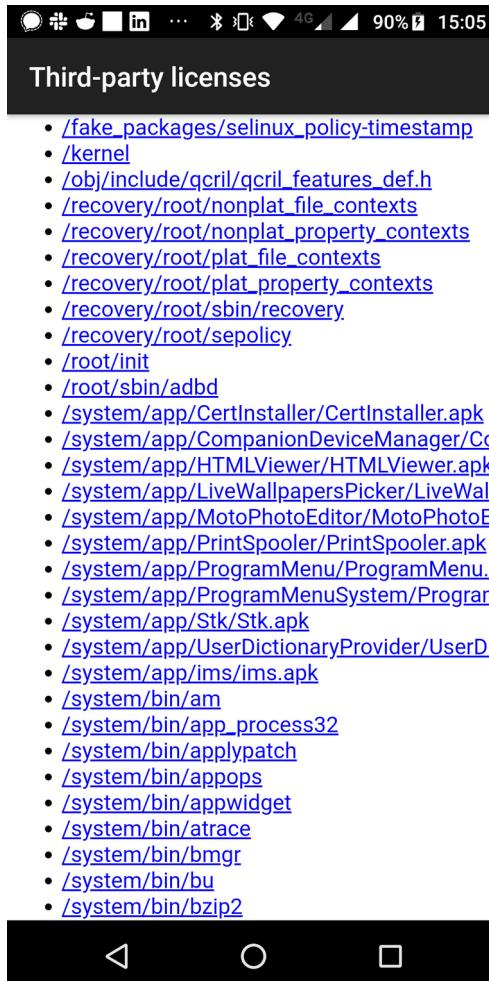
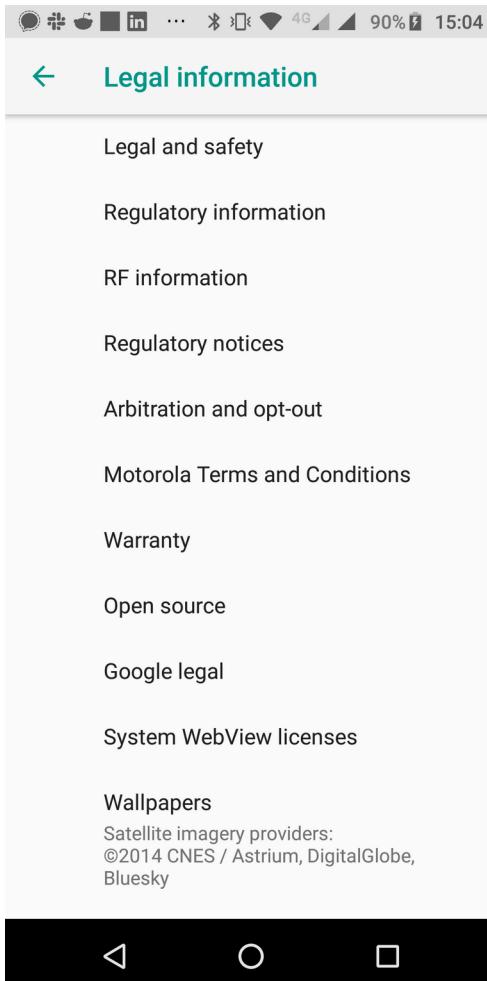
[2] [https://moba.i.daimler.com/bai-cars/ba/foss/content/en/licence\\_agreement.html](https://moba.i.daimler.com/bai-cars/ba/foss/content/en/licence_agreement.html)

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# Android's Legal Notices (Distribution Use-Case)



# License Incompliance Discovery Risk

**Consumer >> Enterprise**

**Low price >> High price**

**Embedded >> Cloud computing**

**Copyleft license >> Permissive license**

# 5. Open Source Governance

# Open Source Governance

- Governance
  - Is the set of processes, practices, institutions, and roles used to lead and manage a social system
- **Open source governance in companies**
  - Is the governance of using open source software in a company, usually in products
    - Initial selection of components
    - Management of dependency
    - Eventual replacement
  - Usually the mandate of an **open source program office**
- Example governance for universities
  - University of California
    - <https://security.ucop.edu/resources/open-source-software-licensing.html>
  - My research group
    - <https://goo.gl/2fm4cx>

# Open Source Don'ts (Example Governance Rules 1 / 3)

- Do not copy open source code and strip the license
- Do not copy open source code of undesired licenses
  - Do not copy code without a license (it is proprietary code)
  - Do not copy copyleft-licensed code into your codebase
  - Do not copy from Stack Overflow (code is copyleft-licensed)
  - Do not copy and paste from open source projects
- Do not include copyleft-licensed libraries into your project
- Do not trust the license that an open source component is labeled with
- Do not combine software components with contradicting licenses

## Open Source Dos (Example Governance Rules 2 / 3)

- Only use permissively licensed open source components
- Prefer governed sources over ungoverned ones like Github
- Maintain a bill-of-materials for the creation of legal notices

# Projects, Licenses, and Sources (Example)

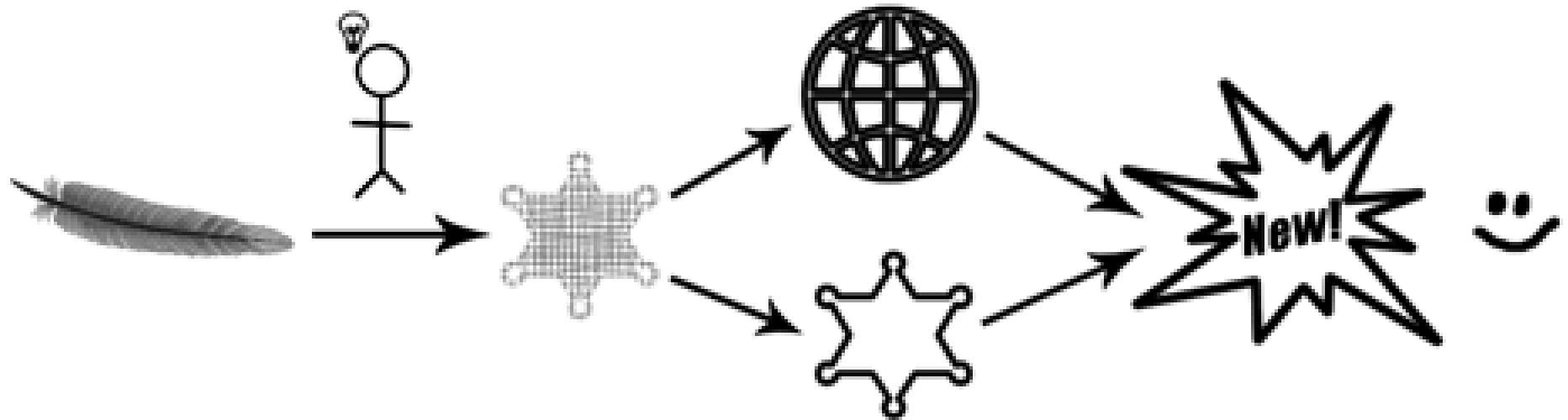
	Allow list	Must-Ask List	Deny List
Projects	<ul style="list-style-type: none"><li>PostgreSQL</li></ul>	<ul style="list-style-type: none"><li>zlib</li></ul>	
Licenses	<ul style="list-style-type: none"><li>MIT</li><li>Apache 2.0</li><li>All BSD variants</li></ul>	<ul style="list-style-type: none"><li>EPL 1.1, EPL 2.0</li></ul>	<ul style="list-style-type: none"><li>Any GPL license</li></ul>
Sources	<ul style="list-style-type: none"><li>ASF website</li><li>Google Github repo</li><li>FB Github repo</li></ul>	<ul style="list-style-type: none"><li>Linux Foundation</li><li>Eclipse Foundation</li></ul>	<ul style="list-style-type: none"><li>Stack Overflow</li><li>Random website</li></ul>

# 6. Problems with Using Open Source

# Problems with Using Open Source Software

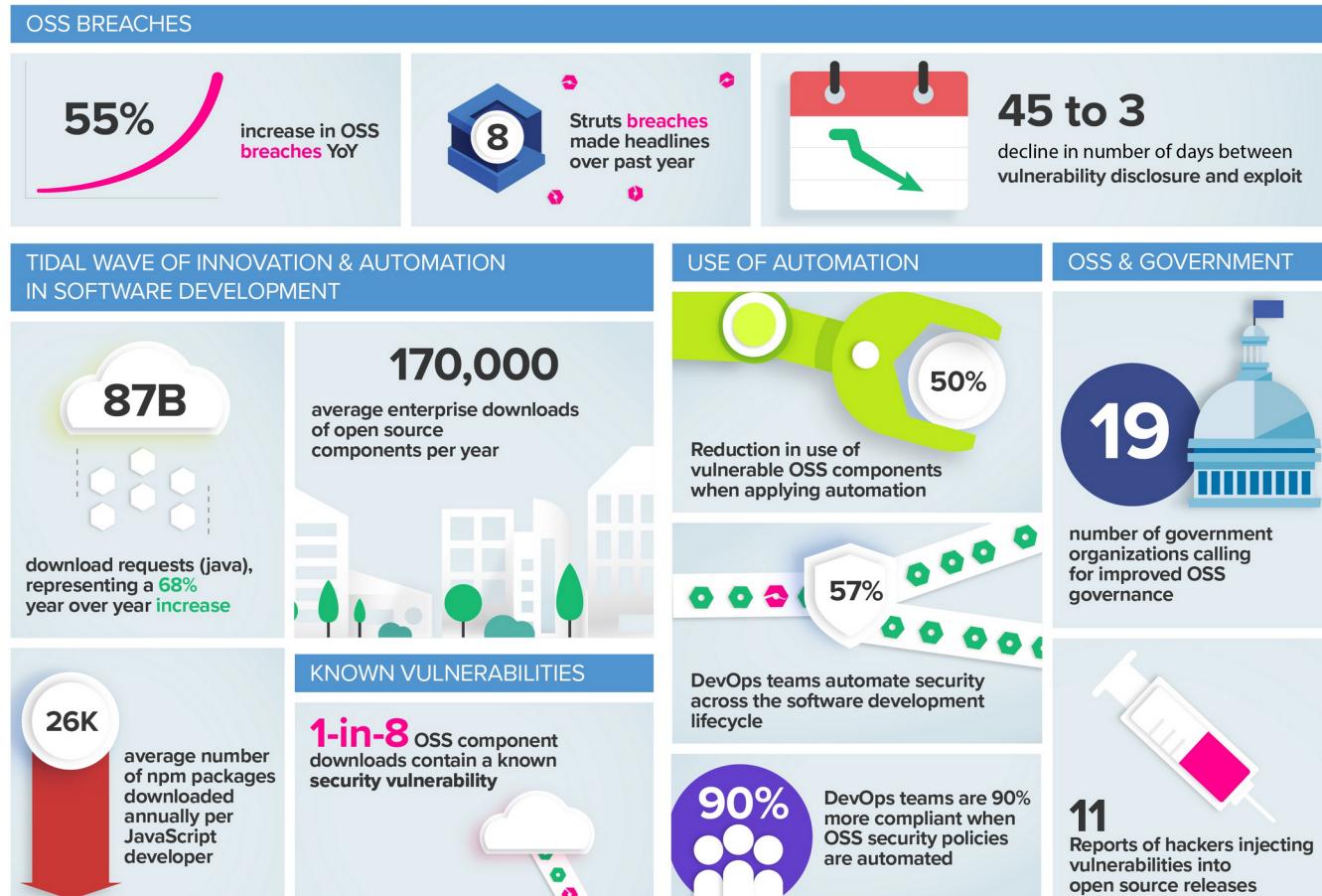
- When using open source software
  - Ensuring clean intellectual property
  - Managing security vulnerabilities
  - Managing the technical dependency
- When building a business on top
  - Ensuring access to source code
  - Ensuring access to trademarks
  - Ensuring access to patents

# Ensuring Clean Intellectual Property [1]



[1] See [https://www.eclipse.org/projects/dev\\_process/ip-process-in-cartoons.php](https://www.eclipse.org/projects/dev_process/ip-process-in-cartoons.php)

# Managing Security Vulnerabilities [1]

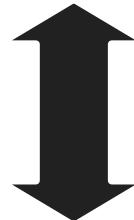


[1] See <https://blog.sonatype.com/2018-state-of-the-software-supply-chain-report>

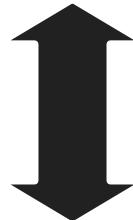
# Ensuring Access to Intellectual Property



Nagios®



iCINGA



Nextcloud

# 7. Open Source Control Mechanisms

# Control Points and Steering Mechanisms [R11]

## 1. Intellectual property control

1. Copyright control
2. Patent ownership
3. Trademark control
4. Media ownership

## 2. Position of social leadership

1. Leadership position
2. Committer rights

# Control Using Intellectual Property Rights

- Through copyright ownership
  - Changing the license going forward
- Through trademark ownership
  - Withdrawing usage trademark right
- Through patent ownership
  - Charging patent license fees
- Through media ownership
  - Use of media to your advantage

# Steering Using Social Leadership

- Through social leadership position
  - Splitting the project community, diminishing its power
  - Keeping unwanted people out of the project
- Through committer rights
  - Delaying or rejecting unwanted contributions
  - Leading the technical direction of the project

# Summary

1. Legal definition (open source software)
2. A (very) short history
3. Open source licenses
4. Open source license compliance
5. Open source governance
6. Problems with using open source
7. Open source control mechanisms

# Thank you! Questions?

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