Scope of disclosure:
Hitachi Group

OSS Basics

FY 2018 version

~ Obtaining a Basic Understanding of How to Actively Use OSS for Business Operations ~

OSS Solution Center
Software CoE
Service Platform Business Division
Hitachi, Ltd.

1-1 What is OSS?

"Open-source software (OSS) is computer software with its source code made available with a license in which the copyright holder provides the rights to study, change, and distribute the software to anyone and for any purpose."

St. Laurent, Andrew M. (2008). "*Understanding Open Source and Free Software Licensing*." O'Reilly Media.
(quoted from Wikipedia)

The source code → **is made public and is available free of charge,** → **and anyone can modify and redistribute it**

```
#include <stdio.h>
  main()
    "......................."
          .
          .
```

Internet, etc.

Click

> Definition of open source software

The definition of freeware is as listed in the rules of the Systems & Services Business Division of Hitachi, Ltd. (SSB).

* OSS is sometimes confused with freeware because both are free of charge. However, a clear difference is that, unlike OSS source code, the source code of freeware is not made public and developers cannot modify it.

1-2 OSS Near Us

OSS is part of our social infrastructure and is everywhere around us.

OSS

Mobile phones/ smartphones

HDD/DVD recorders

Online shops and other websites

Smart televisions

Electronic organizers

Car navigation systems

● **Electronics** OSS is used in mobile phones, smartphones, car navigation systems, and other digital appliances

● **Web** OSS is used in the various hardware and software that make up internet sites, such as online shops and websites.
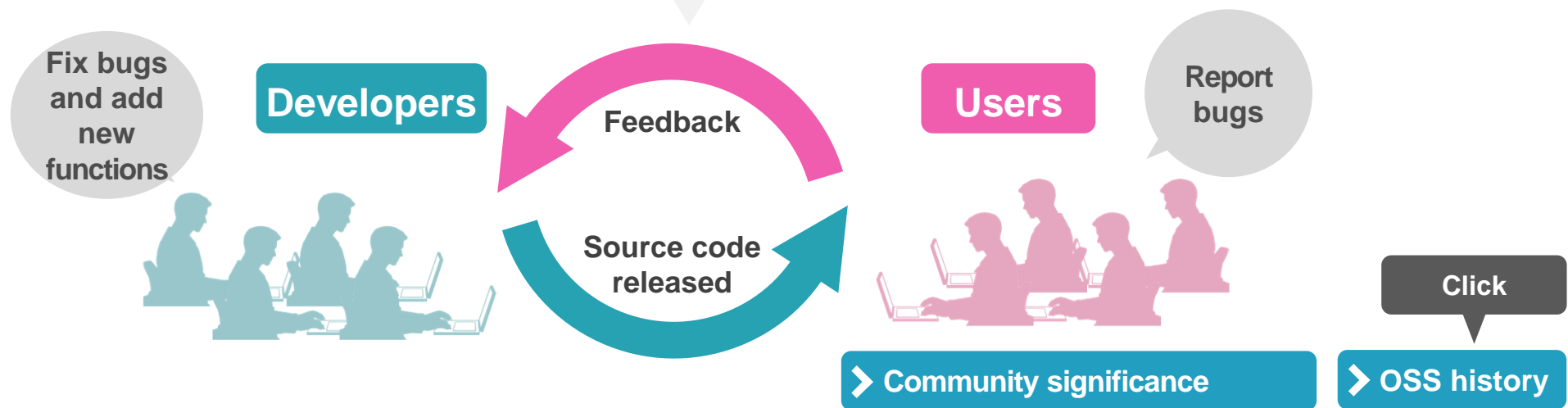
OSS can often be obtained for free, and can be very advantageous for companies looking to use advanced software at low cost!

1-3 Goal of OSS

The goal of OSS is to regularly improve the functionality and quality of software by making source code public and by developers modifying and improving the source code.

Software engineers who wish to improve OSS gather together, generate opportunities to exchange information, and work together to continue development of the OSS. This type of gathering is referred to as an **Open Source Community**, in which developers, users, and various organizations join forces (over the Internet etc.).

Fix bugs and add new functions

Developers

Feedback

Source code released

Users

Report bugs

Click

> Community significance

> OSS history

1-4 General Benefits and Risks of Using OSS

In principle, **you have to take all responsibility** for using OSS. Before using it, you should work with your peers to identify and understand the benefits and risks of using such software.

Benefits	Risks
1. You can reduce development costs because the source code is available for free.	1. There are no guarantees as to the quality of the software, or concerning non-infringement of rights of a third party.
2. You can shorten the development period by using available OSS that is a de facto standard.	2. Any damage that might occur through the use of OSS will not be compensated.
3. You can fix bugs by modifying the source code.	3. Sufficient support services might not be provided.
4. Outstanding software engineers from all over the world are involved in the development of OSS, and some programs have performance levels comparable to that of commercial software.	4. Documentation in Japanese is insufficient.
5. Program development will not be discontinued for reasons such as bankruptcy or merger of a developer.	5. Development might be discontinued (EOL: End of Life) due to a community breakdown or some other reason.
	6. Some licenses may require the disclosure of the source code (copyleft).

Chapter 3 covers the risks of OSS and points on how to deal with them.

1-5 Laws Related to OSS

OSS is a type of software. Software is protected by copyright, and OSS is no exception. Note that, in general, OSS offers no guarantee concerning the non-infringement of patent rights of a third party.

Intellectual property rights

1. **Copyright**
2. **Patent rights**
3. …

OSS

1. Rights such as the rights of reproduction, modification, and distribution are permitted by copyright law.
2. The copyright holder of an OSS program determines the license to be used, and makes the OSS public based on the conditions of the license.
3. A person who obtains authorization from the copyright holder is entitled to utilize the copyrighted work (in this case, the OSS program) to which that authorization pertains within the scope of the authorized usage methods and conditions (in this case, the terms of the license).
4. The license describes authorized usage methods and conditions related to actions such as reproduction, modification, and distribution.

5. In general, OSS offers no guarantee concerning the non-infringement of patent rights of a third party.
6. Some OSS licenses grant the user the patent rights of the owner company free of charge when the OSS is distributed.
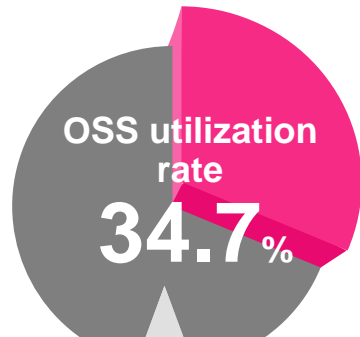
> For more information about licenses, see Chapter 3!

2-1 Increase in the Use of OSS

The use of OSS is spreading across companies, local governments, institutions, and other organizations that want to enjoy the previously described benefits of OSS.

OSS utilization rate

34.7%

Industries with a high utilization rate: information and telecommunications, followed by public services and finance

OSS with high utilization rates (utilization rates over 10%)

Category	Name of OSS	Description	Utilization rate (%)
Virtualization, cloud	Xen	Software used to run multiple OSs concurrently	16.2
	KVM	Software used to run virtual environments on Linux®	10.7
OS	Linux	A UNIX-compatible OS	67.3
File	Samba	File and print server software	21.4
Operation, administration	OpenLDAP	Directory server software	15.5
	Zabbix	Integrated monitoring software	16.2
Web & application servers	Tomcat	Web container software	35.6
	JBoss	Application server software	12.0
Databases, related tools	MySQL	Database management software	53.1
	PostgreSQL	Database management software	35.0

Linux, in particular, has an especially high utilization rate. The number of companies using Linux is increasing as more and more companies begin introducing OSS to mainframes and host systems.

(Source) International Data Corporation Japan 2016.2.5

* Linux is a registered trademark or trademark of Linus Torvalds in Japan and other countries.

2-2 Examples of Local Governments and Institutions Using OSS

Local governments and institutions are moving forward with using OSS to reduce deployment and operation costs for IT systems.

Tokushima Prefecture

- The Tokushima OSS Promotion Association was established through a joint effort by industry, academia, and government to promote optimization of information systems and achieve industrial development through the use of OSS.

Japan Medical Association

- The Japan Medical Association deploys OSS on receipt computers (systems for issuing and managing detailed invoice for medical services)

> **Article from IT Pro by Nikkei Computer:**
> The Tokushima OSS Promotion Association was established through a joint effort by industry, academia, and government to promote system optimization and industrial development

> Japan Medical Association Research Institute declares adoption of IT (explanatory materials)

2-3 Initiatives to Promote the Use of OSS in the Hitachi Group

The use of OSS is a key factor in Hitachi's growth strategy to **promote open innovation**. Hitachi is implementing the following initiatives for proactive use of OSS across various business fields.

Center for Technology Innovation: OSS Technology Laboratory

ITSC contributes to the Hitachi Group's services and solutions business based on the following 3 action policies:
- Provide support and solutions for the secure use of OSS
- Collect practical expertise based on quality assessment and verification
- Contribute to technological innovation by contributing to OSS communities and standardization activities

HISOL: OSS management solutions

SSB: OSS Solution Center

The OSS Technology Laboratory is active in conducting research on OSS, raising awareness about OSS, providing OSS training, and upgrading and maintaining environments where OSS can be put to practical use. The goal is to form a hub connecting the various needs, expertise, technologies, and software engineers related to OSS scattered throughout the Hitachi Group.

HISOL provides a one-stop OSS-related service offering everything from consulting support, to design and operational support for the implementation of OSS, promoting businesses that contribute to the optimization of customer investments in IT.

2-4 Websites Providing Information about OSS ①: External Websites (1)

- These websites are provided by IPA (Information-technology Promotion Agency, Japan). Please visit these websites as needed.

Definition of OSS	These websites provide an explanation of the definition given by the OSI (Open Source Initiative). https://opensource.org/definition http://www.opensource.gr.jp/osd/osd-japanese.html (Japanese Translation by Mr. Masayuki Hatta, February 21, 2004)
OSS licenses approved by the OSI	These websites provide OSS licenses approved by the OSI. https://opensource.org/licenses/ https://osdn.jp/projects/opensource/wiki/licenses (Japanese Translation by the OpenSource Group Japan)
GNU GPLv3 clause-by-clause description	Compiled as a joint project by the IPA Open Software Center Legal Task Group and the U.S.-based SFLC (Software Freedom Law Center), this provides definitive explanations of GPLv3 provisions in an easy to understand manner. https://www.ipa.go.jp/files/000028320.pdf

2-5 Websites Providing Information about OSS ②: External Websites (2)

■ The following external websites provide information such as the level of activity of OSS communities. You can search and visit websites below when assessing OSS.

SCSK Corporation, "OSS Radar Scope®"	**This service is provided by SCSK Corporation to provide ratings of OSS. The ratings are based on information with a high level of transparency that is "discernible from the outside looking in", such as the maturity, quality and service of the OSS, and the stability of the promoting organization.** http: //osdn.jp/projects/opensource/wiki/licenses (Japanese)
Synopsys, Inc., "Open Hub™"	**This is an OSS assessment comparison service offered by Synopsys, Inc. This service covers some 650,000 types of OSS and provides easy-to-understand visual information about community activity trends, such as changes in the volume of source code available and the number of commits.** https: //www.openhub.net/

3-1 Points to Consider When Using OSS

Prior to using OSS, consider the 4 key points below.

Subsequent slides cover these key points in detail.

Point 1 **Understand OSS characteristics (= risks of use)**

Point 2 **Comply with OSS licenses**

Point 3 **Understand and carry out the processes for using OSS**

Point 4 **Take advantage of OSS guidelines**

Characteristic ❶ — In many cases, it is unclear who holds the rights

Various developers, including in-house and freelance developers, from inside and outside communities are involved in OSS development, **making it difficult to identify who holds the rights to the software.**

➡ **You might receive complaints about copyright / patent right infringement or be involved in a lawsuit in the future**

Community

Company A

Company B

Freelancer C

OSS

Company D

Freelancer E

Point 1 ## Understand OSS Characteristics ②
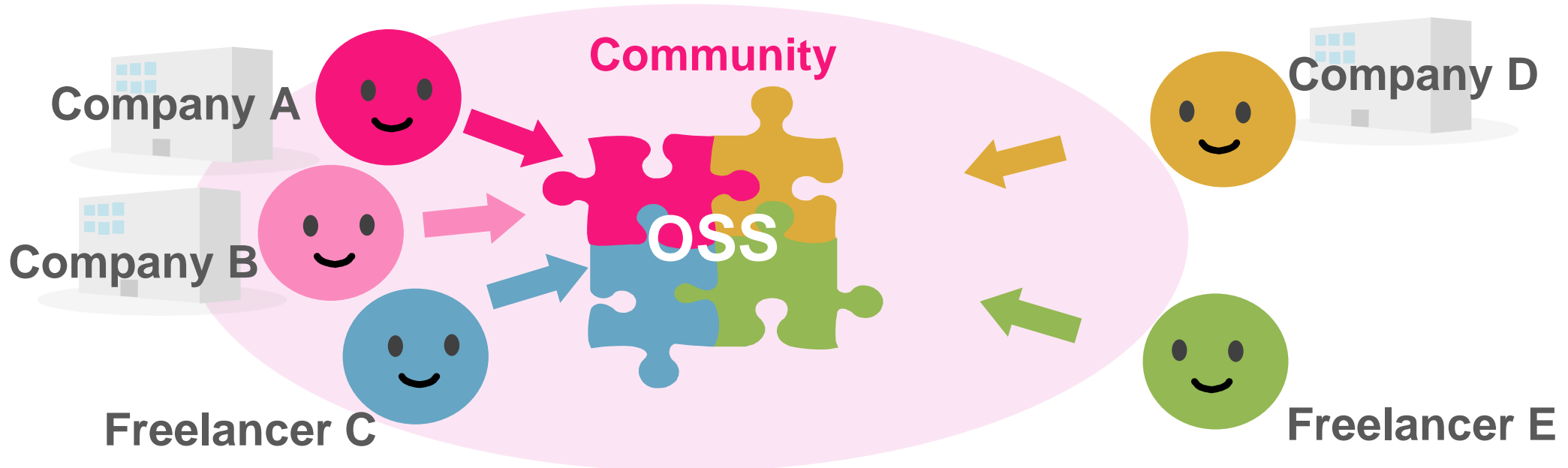
Characteristic ❷ The source code is made public

Anyone can view the source code and make use of OSS to improve software-development productivity.
However, if you accidentally include the source code of publicly available OSS in a program that you develop...

➡ **The OSS copyright holder might make copyright infringement claims**

Usually, when Hitachi (ITSC) develops programs, Hitachi maintains records of technical information used for the development, information about the developers, and history of development for the purpose of configuration management of the developed programs.
When using OSS for program development, it is important to record the name, version number and license of the OSS, and to not use any other OSS.

Source code made public

```
#include <stdio.h>
 main()
  "■......................"
          .
          .
```

= If OSS is used for development

Source code developed

```
#include <stdio.h>
 main()
  "......................"
          .
          .
```

You must state the name, the version, and the applicable license of the OSS that you used.
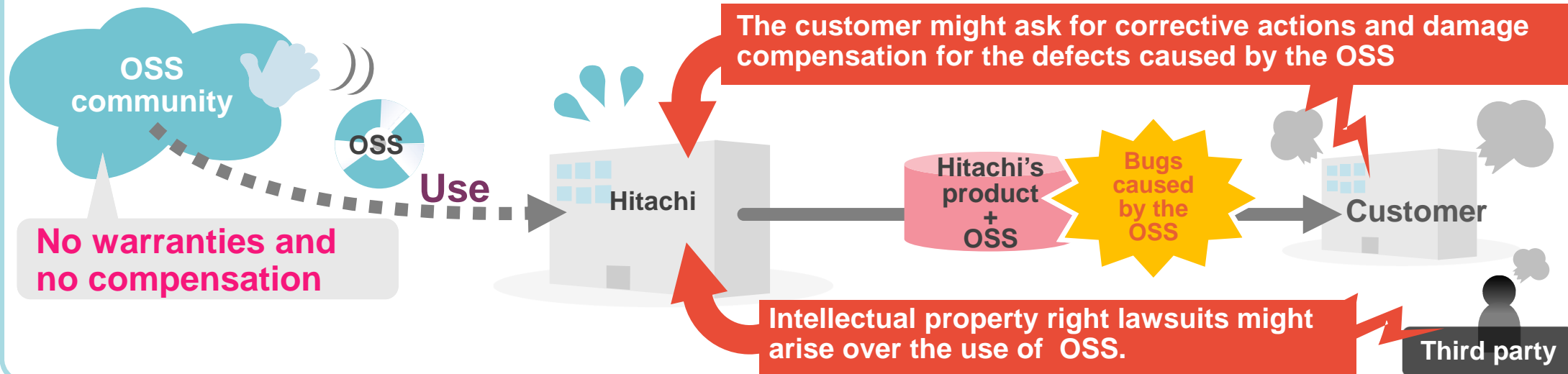
Characteristic ❸ No warranties and no compensation

- In many cases, you cannot expect that the provider of an OSS program has conducted the same level of quality testing and investigations related to third party rights that can be expected for commercial software.

  ➡ The OSS provider does not guarantee OSS quality and non-infringement of the rights of third parties.

- OSS in a software product could contain bugs. In addition, the use and sale of OSS might result in a lawsuit from a third party over infringement of intellectual property rights.

  ➡ The OSS provider is not liable for compensation for any damages

OSS community

OSS **Use** → Hitachi

No warranties and no compensation

Hitachi's product + OSS — Bugs caused by the OSS → Customer

The customer might ask for corrective actions and damage compensation for the defects caused by the OSS

Intellectual property right lawsuits might arise over the use of OSS.

Third party

Point 2 Comply with Licenses ①

OSS copyrights belong to the developer of the OSS and / or the community providing the OSS. OSS is not public domain software for which the copyright has been abandoned. When using OSS, you must comply with the licenses.

Compliance required!

OSS license provisions

OSS

In general, you must add a copyright notice, provide license statements, and indicate the copyright owner of the OSS.

OSS community

OSS copyrights belong to the OSS developer and / or community

Point 2 **Comply with Licenses ②**

Knowledge of common characteristics of OSS license conditions will help you understand various license conditions. The table below shows 3 license types that focus on the act of use and obligations to disclose the source code. Try to remember the characteristics of these license types.

#	License type	Act of use	Obligation to disclose the source code when (re)distributing the OSS	
		Copy, modify, and (re)distribute	Modified portion	Portion of the source code linked with the OSS
1	**Copyleft type (GPL type)**	**Permitted**	**Source code disclosure is required** [1]	**Source code disclosure is required** [1]
2	**Semi-copyleft type (MPL type)**	**Permitted**	**Source code disclosure is required**	**Source code disclosure is not required** [2]
3	**Non-copyleft type (BSD license type)**	**Permitted**	**Source code disclosure is not required**	**Source code disclosure is not required**

[1] For GPL and AGPL, source code corresponding to the distributed binary code must also be provided.
   For AGPL, providing services to external parties (including other corporations and general consumers) over networks is regarded as distribution.
[2] For LGPL, object code or source code corresponding to the distributed binary code must be provided. (Note, however, that you can choose which to provide.)

Some OSS licenses are complicated and difficult to understand. If necessary, consult with the departments specializing in legal affairs, intellectual property, or procurement in your company or business division.

3-7 | Point 2 | Comply with Licenses ③

The table below shows examples of licenses corresponding to each license type. Use this as a reference when confirming the license type.

#	License type	Examples of OSI* authorized licenses
1	**Copyleft type** **(GPL type)**	• **GPL (GNU General Public License)** • **AGPL (GNU Affero General Public License)** • **European Union Public License**
2	**Semi-copyleft type** **(MPL type)**	• **LGPL (GNU Lesser General Public License)** • **MPL (Mozilla Public License)** • **Apple Public Source License** • **EPL (Eclipse Public License)** • **CPL (Common Public License)**
3	**Non-copyleft type** **(BSD license type)**	• **BSD License** • **MIT License** • **ZPL (Zope Public License)** • **Apache Software License** • **Artistic License (Perl License)**

*OSI: Open Source Initiative. A non-profit institution promoting a culture of open source software

3-8 Point 2 Comply with Licenses ④

When you use multiple OSS packages, make sure that the licenses of the packages are compatible with each other.

- When using multiple OSS packages, make sure that **the licenses of those OSS packages do not conflict with one another** (in other words, make sure the licenses are **compatible**). In addition to OSS licenses, make sure that the licenses are also compatible with the licenses applied to other software and libraries that you use.

- If you simultaneously use multiple OSS packages whose licenses conflict with one another, at least one of the packages is considered to be a **license violation**, and cannot be used. Moreover, you **cannot distribute** products and applications that use multiple OSS packages whose licenses conflict with one another.

- Examples of compatible licenses: (a) LGPLv3 – GPLv3, (b) AGPLv3 – GPLv3, (c) Apache License v2.0 – GPLv3, (d) MIT License – GPLv3,v2

- Examples of incompatible licenses: (e) 4-Clause BSD License - GPLv3, (f) Apache License v2.0 - GPLv2

- License compatibility is a complex issue. Be sure to consult with **legal experts**.

Some OSS packages have multiple licenses. Select the licenses to be used as follows:

- For OSS, licenses are assigned based on the intentions of the copyright holders. As described in 3-8, some licenses are not **compatible** with other licenses. For example, assume that a copyright holder assigned OSS the copyleft-type GPLv2 license, which allows anyone to make improvements to the OSS. However, a GPLv2 license cannot be used together with an Apache License v2.0, because they are not compatible. In this case, the copyright holder of the OSS assigns another license that can be used together with other licenses so that the OSS can be widely used, and then makes the OSS public via **dual licensing**, which allows OSS users to select the appropriate license.

- When **dual licensing** is used, after first checking the contents of all licenses, **you can select the desired license at the time of distribution**. (You can select one or more licenses. However, you must fulfill the obligations of all of the licenses you select at the time of distribution.)

- Product-version OSS vendors often provide such OSS by using dual licensing, consisting of the license of the original OSS from which the product-version OSS is developed and **the license defined by the vendor**. In this case, you can also select and use the license that best meets your needs. (In most cases, such vendors define non-copyleft-type licenses.)

What are the processes for using OSS?

- In the development process for general products and systems, a set of steps for handling OSS that takes the characteristics of OSS into account is commonly referred to as the **OSS compliance management process**.

- When you contribute to an OSS community, the "OSS distribution process", during which the appropriateness of OSS distribution is determined, is commonly referred to as the **OSS compliance management process (for contribution)**.

- **Chapter 4** describes these two processes in greater detail, and also defines <u>rules to be observed when using OSS for business operations</u>. The main rules include <u>OSS acquisition rules and OSS disclosure rules</u>.

The **OSS acquisition rules and OSS disclosure rules** are important rules for using OSS.

These rules are defined separately for each **division and Group company**. Please check your division or company's rules.

OSS acquisition rules

OSS disclosure rules

What are OSS guidelines?

Click

- Hitachi defines a set of OSS guidelines called the **"Guidelines for the handling of open source software"** (hereinafter referred to as the **OSS guidelines**).

- Hitachi's OSS guidelines define **what to do when using OSS in Hitachi businesses**.

- The OSS guidelines provide information about **various risks and how to handle them (points to consider and implement in each process that occurs as a part of business activities), necessary internal procedures, contact information, etc.**

- Target businesses: Development of hardware and software products, contracted development, creation of service infrastructures for external customers

> OSS guidelines for SSB employees

> OSS guidelines for non-SSB employees

OSS guidelines

Chapter 5 provides an overview of the OSS guidelines!

4-1 Development Process for General Products and Systems

- Recently, a growing number of OSS packages are being used as components of products and systems.

- Even if OSS is used for product development, the basic process to be followed is the same as the traditional development process.

- By using OSS for development, you can expect to be able to shorten the development time and reduce development costs. On the other hand, however, **you must implement special handling, in consideration of the fact that OSS is provided free of charge, with no warranties and no compensation** (an overview of the points to keep in mind is provided in the subsequent chapters).

- Although the specific details may vary among divisions and Group companies, the subsequent chapters describe the development process by assuming that the general development process used for products and systems (hereinafter collectively referred to as the development process) is as shown in the diagram below.

- The development process consists of the following five steps: (1) Consideration, (2) Development, (3) Inspection, (4) Shipment, and (5) Maintenance
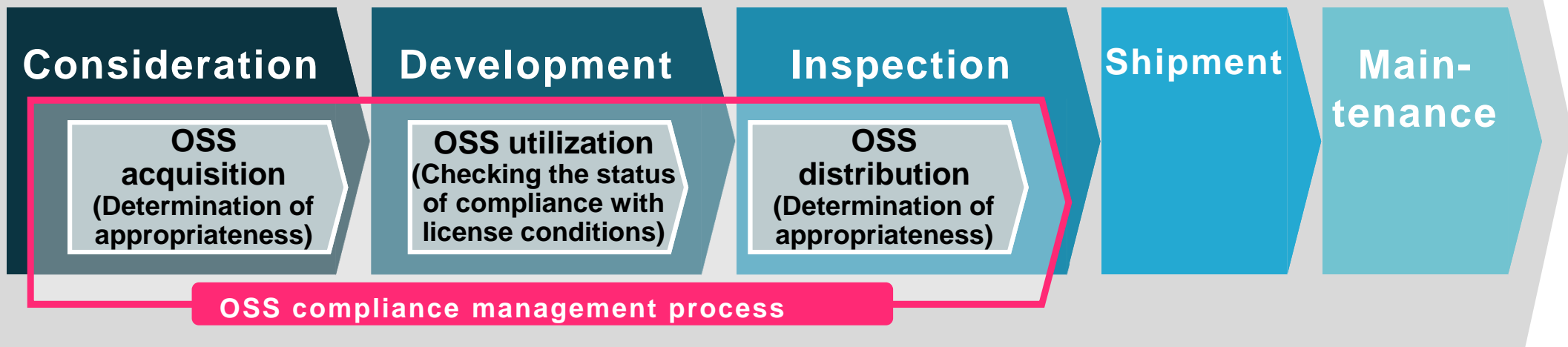(Note that details descriptions of these steps are omitted.)

Development process for general products and systems

Consideration	Development	Inspection	Shipment	Main-tenance

4-2 Relationship Between the Development Process and the OSS Compliance Management Process

- The following diagram shows the relationship between the steps required for handling OSS (in consideration of the special characteristics of OSS) and the steps of the development process. Determinations must be made in each step of this development process, such as the determination of whether the use of the OSS is appropriate.

- Note that this set of steps required for handling OSS is commonly referred to as the OSS compliance management process.

- The OSS compliance management process consists of the following three steps: (1) OSS acquisition, (2) OSS utilization, (3) OSS distribution

Development process for general products and systems

Consideration	Development	Inspection	Shipment	Main-tenance
OSS acquisition (Determination of appropriateness)	**OSS utilization** (Checking the status of compliance with license conditions)	**OSS distribution** (Determination of appropriateness)		

OSS compliance management process
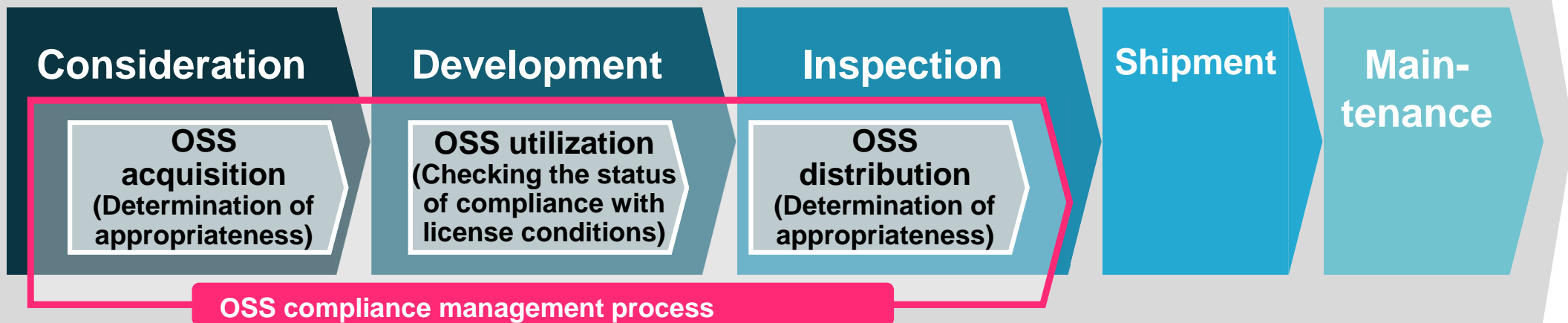
4-3 What is the OSS compliance management process?

- The OSS compliance management process consists of the following three steps, which are performed as part of the development process.

    (1) OSS acquisition, performed during the "Consideration" step

    (2) OSS utilization, performed during the "Development" step

    (3) OSS distribution, performed during the "Inspection" step

- Subsequent slides describe the items to be checked, and the relevant parties concerned with each step of the OSS compliance management process.

Development process for general products and systems

Consideration	Development	Inspection	Shipment	Main-tenance
OSS acquisition (Determination of appropriateness)	OSS utilization (Checking the status of compliance with license conditions)	OSS distribution (Determination of appropriateness)		

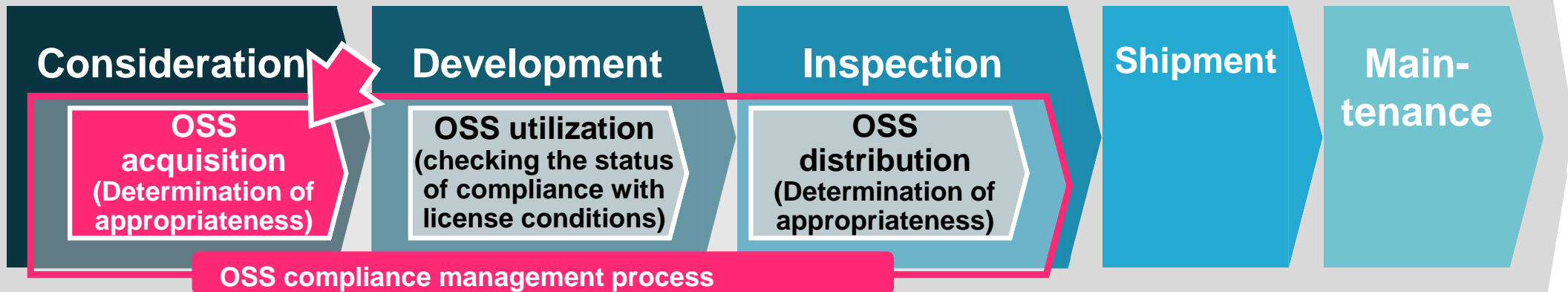**OSS compliance management process**

4-4 Items to Be Checked and Relevant Parties Concerned with Each Step in the OSS Compliance Management Process

(1) OSS acquisition step

When acquiring OSS to be used for products, the items in the table below must be carried out as part of the OSS acquisition step, during the "Consideration" step.

Development process for general products and systems

Consideration	Development	Inspection	Shipment	Main-tenance
OSS acquisition (Determination of appropriateness)	**OSS utilization** (checking the status of compliance with license conditions)	**OSS distribution** (Determination of appropriateness)		

OSS compliance management process

Main items to be checked during OSS acquisition

- The OSS program name (including the version), the original rights holder, and the license
- The intended purpose of the OSS (whether the OSS is to be copied, modified, or redistributed, and whether the OSS is to be used within the company or provided outside the company)
- License conditions based on the intended use, and whether those conditions can be complied with
- Whether the license is propagated (whether the source code of your company is disclosed, etc.)
- Management and retention of the OSS and the OSS acquisition records

Relevant parties for OSS acquisition

Applying to acquire the OSS:
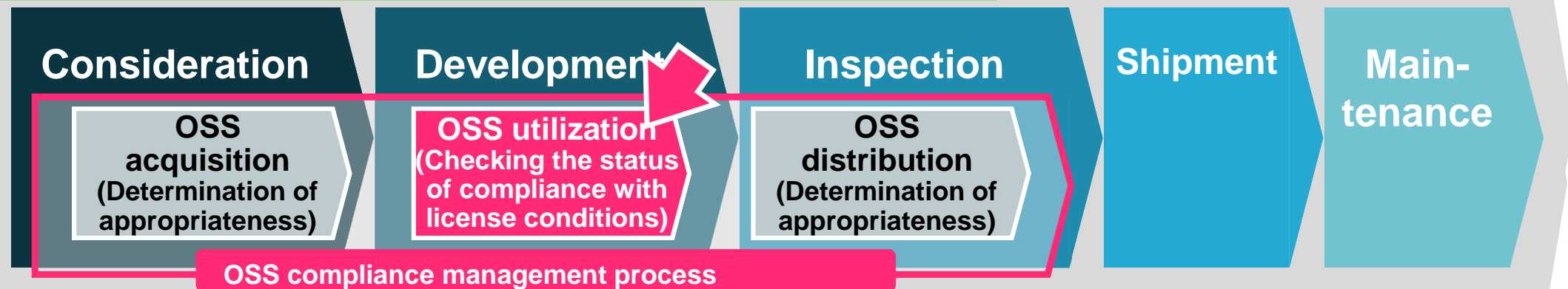- Department managers and project team members

Determining appropriateness:
- Technology management departments, procurement departments, legal departments, and finance departments
  Note that the method and the organizational structure for determining appropriateness vary depending on the status of OSS distribution (for example, whether the OSS has already been distributed to other departments) in the relevant business units and Group companies.

4-4 Items to Be Checked and Relevant Parties Concerned with Each Step in the OSS Compliance Management Process

(2) OSS utilization step

When using OSS that you have acquired in a product (regardless of whether the OSS is modified), the items in the table below must be carried out as part of the OSS utilization step.

Development process for general products and systems

Consideration	Development	Inspection	Shipment	Main-tenance
OSS acquisition (Determination of appropriateness)	OSS utilization (Checking the status of compliance with license conditions)	OSS distribution (Determination of appropriateness)		

OSS compliance management process

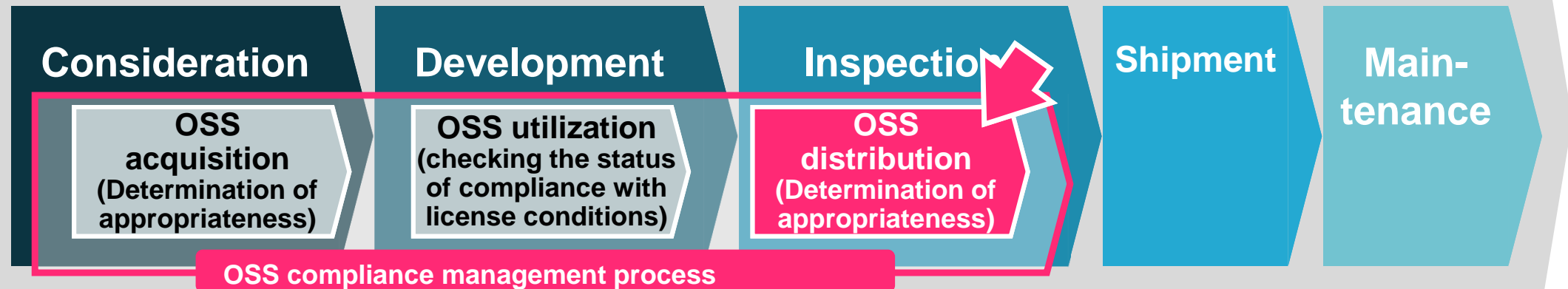| Main items to be checked during OSS utilization	Relevant parties for OSS utilization
• Operation and performance • Notifications and indications of the use of the OSS (including additional provisions and a list of OSS licenses) as necessary • Confirmation of where and to whom the OSS (source code) will be released • Licensing checks (including checks of whether any OSS was reused, and checks of licenses for any reused OSS) • Checks to prevent the OSS from being used for unintended purposes (to prevent the infringement of copyrights belonging to other parties) • Checks to prevent the infringement of patents belonging to our company or to other parties • Whether the license is propagated (whether source code belonging to your company is disclosed, etc.). • Management and retention of the OSS development records • Any other required procedures related to OSS licenses, etc.	• Department managers and project team members

4-4 Items to Be Checked and Relevant Parties Concerned with Each Step in the OSS Compliance Management Process

(3) OSS distribution step

Before shipping (distributing) a product in which OSS is used, in the inspection step of the development process, the items in the table below must be carried out as part of the OSS distribution step, during the inspection step of the development process.

Development process for general products and systems

Consideration	Development	Inspection	Shipment	Main-tenance
OSS acquisition (Determination of appropriateness)	**OSS utilization** (checking the status of compliance with license conditions)	**OSS distribution** (Determination of appropriateness)		

OSS compliance management process

Main items to be checked during OSS distribution	Relevant parties for OSS distribution
• Whether the OSS acquisition step has been carried out • Whether the OSS utilization step has been carried out, etc.	• Quality assurance departments

4-5 What Are Contributions to OSS Communities?

This side and the subsequent slides describe the process of contributing to OSS communities.

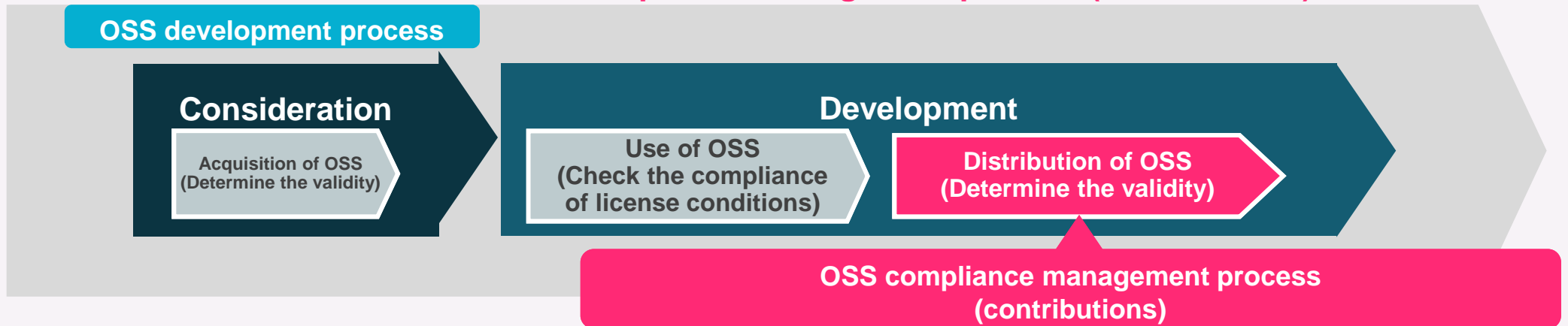**A give-and-take attitude is essential for OSS.**

- These days, it is impossible for any one company to establish and operate systems on their own. To create cutting-edge systems in particular, collaborations with various people and companies are necessary. To achieve this, it is essential to create win-win relationships (an ecosystem) in which various people and companies help one another.

- The concept of this ecosystem also applies to OSS communities. OSS is created through the collaboration of many engineers. It is important for people who use OSS to be grateful for this collaboration, and to contribute to OSS communities in kind.

- There are many ways to "contribute to OSS". Use the following examples as a reference, and find a way in which you can contribute, too.

Contribution method	Examples of contributions
OSS development	• Developing OSS functions • Fixing OSS bugs, etc.
Verifying the utilization of OSS	• Performing OSS verification (performance analysis, reliability analysis, etc.) • Reporting OSS bugs, etc.
Promoting the use of and increasing the adoption of OSS	• Joining external organizations (preparing documents (including translation and proofreading), responding to inquiries to communities) • Holding OSS-related seminars, posting OSS-related information, etc.

- The following slides describe the process of contributing to OSS via OSS development (developing OSS functions, fixing OSS bugs, etc.), which is one example of a way to contribute to OSS.

- Note that, when performing activities for verifying OSS utilization and for promoting the use of and increasing the adoption of OSS, you must comply with the rules related to information disclosure, including the rules specified by each division or each Group company for examining external posting and external lectures.
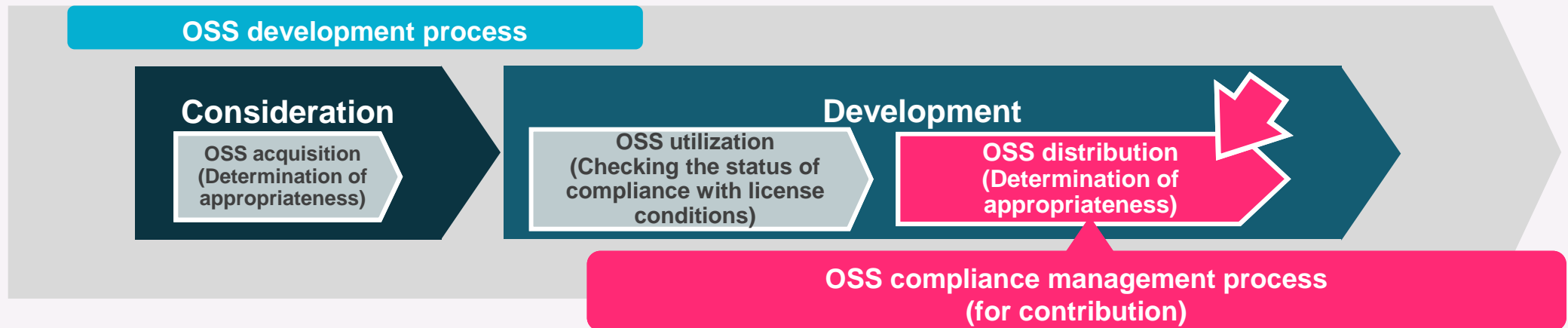
4-6 Process for Making Contributions to OSS

- **The basic process of OSS development is no different from the conventional development process that has been implemented. However, disclosure of the OSS development results# differs from delivery of a product.**

  #: OSS development results are to be disclosed by taking into account the fact that OSS is distributed free of charge and with no warranties and no compensation.

- **The OSS development process consists of two steps: consideration and development. This document focuses on the distribution of OSS in the development process, which is equivalent to disclosing the development result. Details about items to check and related divisions are described on the next page, by.**

- **For convenience, the OSS distribution step in which validity concerning distribution of OSS is determined is referred to as "OSS compliance management process (contributions)".**

OSS development process

Consideration

Acquisition of OSS
(Determine the validity)

Development

Use of OSS
(Check the compliance
of license conditions)

**Distribution of OSS
(Determine the validity)**

**OSS compliance management process
(contributions)**

4-7 Items to Be Checked and Relevant Parties Concerned with the OSS Contribution (OSS Distribution) Process

- When newly developed OSS functions, OSS bug fixes, etc., are to be distributed (released), the items in the table below must be carried out as part of the OSS distribution process.

OSS development process

Consideration

OSS acquisition (Determination of appropriateness)

Development

OSS utilization (Checking the status of compliance with license conditions)

OSS distribution (Determination of appropriateness)

OSS compliance management process (for contribution)

Main items to be checked during OSS distribution	Departments related to OSS distribution
• Operation and performance checks • Checks of the OSS program name (to prevent the infringement of trademarks belonging to other parties) • Confirmation of where or to whom the OSS (source code) will be released • Licensing checks (including checks of whether any OSS was reused, and checks of licenses for any reused OSS) • Checks to prevent the unintended use of OSS (to prevent the infringement of copyrights belonging to other parties) • Checks to prevent the infringement of patents belonging to our company or by other parties • Export management • Management and retention of OSS release records • Other required procedures related to OSS licenses, etc.	Applying to release the OSS: • Department managers and project team members Determining appropriateness: • Technology management departments, planning departments, procurement departments, legal departments, and departments in charge of the relevant technologies Note that the method and the organizational structure for determining appropriateness vary depending on the status of OSS distribution (for example, whether the OSS has already been distributed to other departments) in the relevant business units and Group companies.

5-1 Considerations and Implementation Items When Deploying OSS ①

The following describes the considerations and implementation items when using OSS in each process.
On this page, details are described from the perspective of the considerations and implementation items when deploying OSS.

Considerations and implementation items when using OSS

1.	**Investigate the provider and check the amount and quality of information available**	• Investigate the state of community activity and the state of operation • Check the content and quality of information delivered by the community, and how frequently information is delivered
2.	**Check the OSS usage type**	• Check the content of license conditions that you should comply with, based on the OSS usage type
3.	**Check the OSS usage type, license conditions, and risks**	• Assess the risks of third party software, the risks of consigned development, and the risks of using OSS in terms of functionality and quality
4.	**Consider measures to preserve original work and prevent the leakage of proprietary technology**	• Implement source code management and OSS use management to preserve the original work of Hitachi-developed program source code, in order to prevent the unintentional disclosure of company technical information

5-2 Considerations and Implementation Items When Deploying OSS ②

1. Investigate the provider and check the amount and quality of information available

Regardless of your involvement with OSS (whether you are participating in OSS development or using OSS), it is important to first check the state of OSS community activities and operation, and the content, quality, and frequency of information being distributed (for example, the EOL (end-of-life), frequency of version upgrades, and access from users and developers in the community).

The state of community activities and operation can affect the **quality of OSS and the potential for third party rights infringement.**

What is the state of activity regarding the OSS?
State of activity and operation, and the content, quality and frequency of information being distributed, etc.
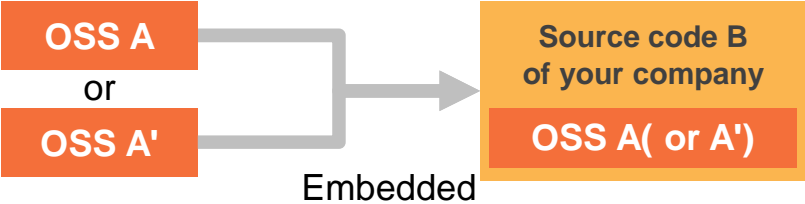
Providing the source code from outside the community

OSS Community

Participating in a community, OSS development

OSS use only
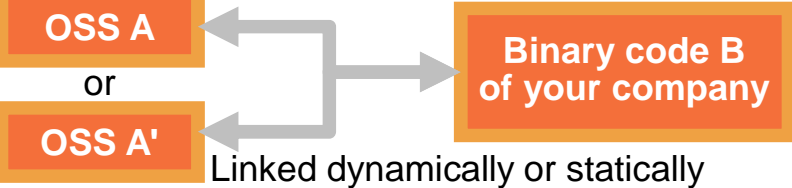
Would it be okay to use OSS from this community?

When carrying out investigations and checks, refer to information provided by organizations promoting OSS use within the company, and to the external websites described in Chapter 2, etc.

5-3 Considerations and Implementation Items When Deploying OSS ③

2. Check the OSS usage type, license conditions, and risks

By examining the license conditions and risks based on the OSS usage type, clarify whether you should disclose the source code, whether you should implement measures to limit the scope of disclosure, and whether you should consider the use of non-copyleft OSS or proprietary development.

OSS usage		License conditions applied	Intellectual property risks
Modify OSS for use	OSS A → Modified → OSS A'	The modified source code must be disclosed [For copyleft type and semi-copyleft type]	● Hitachi's technical information about the modified part of the source code might leak
Embed the source code	OSS A or OSS A' → Embedded → Source code B of your company / OSS A(or A')	OSS license conditions propagate to parts of the source code developed by Hitachi [For copyleft type and LGPL^{*1}]	● Hitachi's technical information (in the worst case scenario, the exposure of the entire source code for the product) might leak
Link binary code	OSS A or OSS A' ← Linked dynamically or statically → Binary code B of your company	OSS license conditions propagate to parts of the product, etc. (linked parts) [For copyleft type and LGPL^{*1}]	*1: Object code or source code must be provided (Note, however, that you can choose which to provide).

5-4 Considerations and Implementation Items When Deploying OSS ④

3. Examine OSS functionality, quality, maintainability, and vulnerabilities

The quality and non-vulnerability of OSS is not guaranteed. For Hitachi, it might be extremely difficult to perform maintenance and implement measures related to these issues.
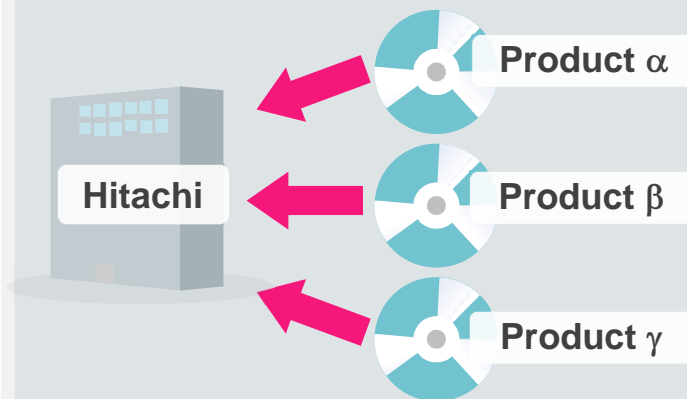For this reason, you must carry out the tasks below:

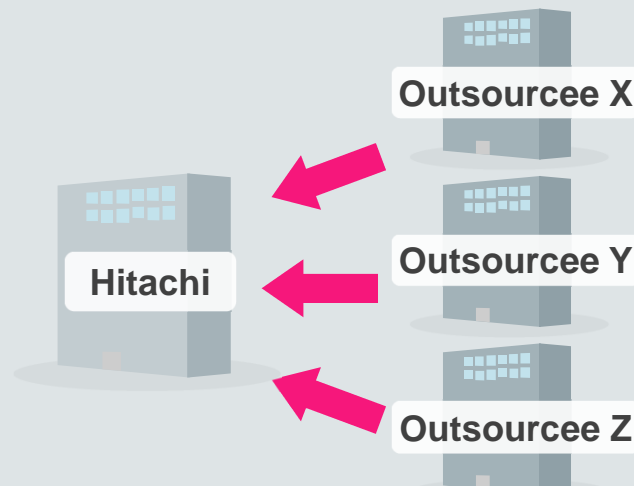**Can you perform maintenance at your own responsibility?**

What are the customer requirements?

What community information is available?

---

1 **Consider implementation of other company's products that have similar functionality**

Product α

Product β

Product γ

Hitachi

2 **Consider outsourcing the development**

Outsourcee X

Outsourcee Y

Outsourcee Z

Hitachi

3 **Examine the following factors related to OSS and thereby establish maintenance plans and prepare contracts**

- Is operation stable?
- Is maintenance support available via the distributor?
- Have any contingency plans been put in place if you perform maintenance at your own responsibility?

Maintenance plan

Maintenance contract

4. Consider measures to preserve original work and prevent the leakage of proprietary technology

When distributing OSS of the copyleft type, Hitachi is subject to the **risk** that Hitachi might be **obligated to disclose** parts of **the OSS source code** modified by Hitachi or, in the worst case scenario, disclose the entire source code of the Hitachi product. You must **define specific measures to preserve the original work of Hitachi products and prevent proprietary technologies from leaking** at the product development implementation level in order to avoid unnecessary disclosure of Hitachi's technical information.

#	Status	Items to be considered and implemented
1	**When distributing OSS of the copyleft type**	• **Measures to preserve original work** - **Clearly distinguish between originally developed content and the content developed by using the OSS source code** - **Limit the use of OSS for development and implementation** - **Prepare and keep development records of products, etc.**
2	**There is a risk that your company might be obligated to disclose parts of the OSS source code modified by your company or, in the worst case scenario, disclose all of the source code of your company's product.**	• **Measures to prevent the leakage of proprietary technologies** - **Review and confirm how software is used between Hitachi-developed software and the OSS software** [*1] • **Verify the license provisions (and individual exemptions)**

(*1) Calling and linking methods used between components from a Based on/Used perspective.

5-6 Considerations and Implementation Items When Developing/Selling Products That Use OSS ①

From the next page, details are described from the perspective of the considerations and implementation items when developing or selling products that use OSS.

Considerations and implementation items when developing or selling products that use OSS

1.	**Prepare contracts and other information, and provide explanations and reach agreements with the customer**	• Prepare sales contracts by taking OSS license conditions into consideration. • Explain the risks of OSS use and the extent to which Hitachi can be held responsible to customers, and have them agree to such provisions in contract form.
2.	**Address patent risks**	• Make a comprehensive judgment weighing up the risks of third party patent right infringements and of, in effect, providing free licensing of Hitachi's or Hitachi Group's patents, and comparing these risks with the business-related benefits of OSS use. Then implement a response based on this judgment.
3.	**Implement export control**	• Implement export control if the OSS is to be exported.

5-7 Considerations and Implementation Items When Developing or Selling Products That Use OSS ②

1. Prepare contracts and other information, provide explanations and reach agreements with the customer

If Hitachi sells products including OSS under the standard sales contract conditions of Hitachi, Hitachi will be subject to excessively high risks because OSS is normally provided without warranty conditions. To mitigate those risks, you must **add special provisions that clearly define the scope of Hitachi's responsibility.**

(1) **Add special provisions** to the sales contract, **stating that your company shall bear no responsibility for quality issues and defects caused by the OSS.**

(2) Include OSS license conditions in the sales contract.

(3) When explaining the sales contract to the customer, explain that OSS is included in the product. Also explain the special characteristics of the OSS license conditions (no warranty, etc.) that apply.

(4) Explain the terms and conditions of the sales contract (see (1) and (2) above), **and reach contractual agreements on these terms and conditions with customer.**

Software product

Program/product user license agreement, etc. **+** Additional software provisions | OSS license

Part of the special provisions

Product developed on a contract basis

Solution service contract, etc. **+** Memorandum or Service specifications **+** OSS license
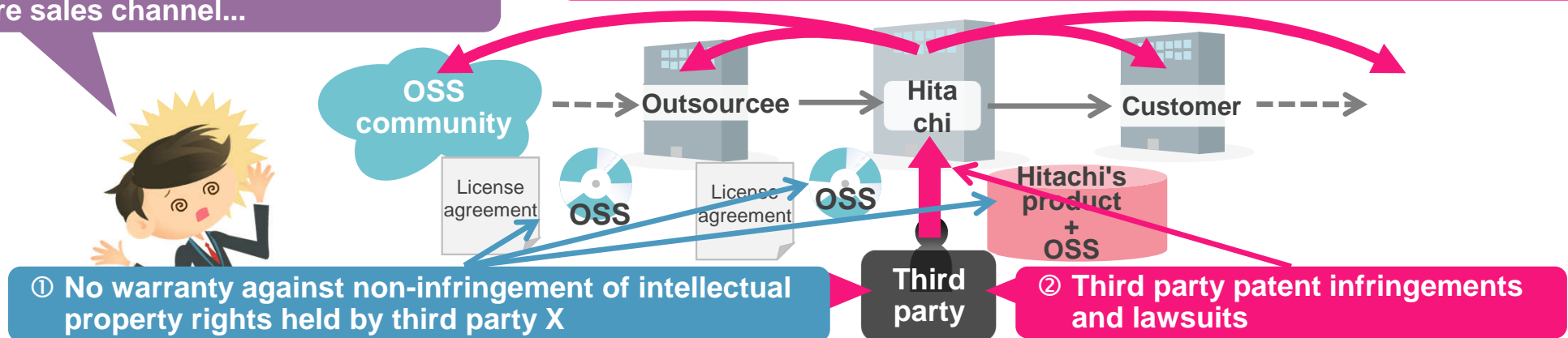
Part of the special provisions

5-8 Considerations and Implementation Items When Developing or Selling Products That Use OSS ③

2. Address patent risks

OSS licenses do not warrant that third party intellectual property rights are not infringed upon **(Fig. ①)**. This means that the use of OSS is accompanied by the risk of being involved in a lawsuit initiated by a third party **(Fig. ②)**. Furthermore, some OSS licenses require the OSS user (i.e., Hitachi (your company)) not to assert any patent rights held by the user (i.e., Hitachi (your company)) with regard to the OSS in use (in effect, to grant the license free of charge) **(Fig. ③)**.

There are 2 major patent risks. These risks might even affect the entire sales channel...

③Non-assertion of company-held patent rights, and obligation to grant substantially free licensing

OSS community → Outsourcee → Hitachi → Customer

License agreement — OSS

License agreement — OSS

Hitachi's product + OSS

Third party

① No warranty against non-infringement of intellectual property rights held by third party X

② Third party patent infringements and lawsuits

Actions
- Apply (or consider application) for a patent on your product and investigate patents of third parties during development.
- Conduct comprehensive evaluation of the benefits and risks with the use of OSS.
- Consult with the department in charge of patents in your organization if any specific concern arises.

Considerations and Implementation Items When Developing or Selling Products That Use OSS ④

3. Implement export control

OSS is considered as *public domain software* because its source code is made public.
However, depending on how the OSS is used, you might need to implement legal procedures based on the export control laws and regulations that apply in Japan and the U.S.

If the OSS is **not modified** =	The OSS might be considered as public domain software on some occasions.

If your company wants to disclose OSS source code with encryption functionality on an Internet website

→ **Japan Foreign Exchange and Foreign Control Law:** OSS is considered as public domain software.

→ **U.S. EAR:** The relevant U.S. government authorities might need to be notified based on the prescribed procedure.

If the OSS **is modified** =	The OSS is not considered as public domain software.

If your company wants to provide the modified OSS to an overseas Group company for "internal use" within the Hitachi Group

→ **If the OSS is not made public on Internet Websites, etc., the OSS is not considered as public domain software, and therefore your company must implement export control procedures before providing the OSS.**

Actions

- Verify and confirm in advance whether you must follow any export control procedures.
- Consult with the person responsible for export control in your organization if you cannot determine whether you must follow such procedures.

Summary

To actively use OSS, you must ...

1. **Understand OSS characteristics**
2. **Comply with OSS licenses**
3. **Understanding and carry out the process for using OSS**
4. **Take advantage of OSS guidelines**

To use OSS in a variety of business areas, it is important to understand **OSS characteristics**, and **comply with licenses**. To this end, **using OSS guidelines** is effective.

Take advantage of these guidelines to facilitate your future business activities in situations where OSS is used.

Indications Regarding References to Other Company Product Names, Trademarks, Etc.

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OSS Basics

~ Obtaining a Basic Understanding of How to Actively Use OSS for Business Operations ~

This concludes these training materials.
Thank you for your attention.

OSS Solution Center
Software CoE
Service Platform Business Division
Hitachi, Ltd.

Supplementary: The Open Source Definition

■ **Definition specified by Open Source Initiative (OSI)**

Open source doesn't just mean access to the source code. The distribution terms of open-source software must comply with the following criteria:

1. Free redistribution
2. Disclosure of source code
3. Permitting creation and distribution of derived works
4. Ensuring the integrity of the author's source code
5. No discrimination against persons or groups
6. No discrimination against fields of endeavor
7. Distribution of license
8. License must not be specific to a product
9. License must not restrict other software
10. License must be technology-neutral

Appendix: Definition of Open Source Community

■ Definition from the IT dictionary *e-Words*:

A private nonprofit organization, with individuals at its core, that conducts activities related to OSS whose source code is open to the public free of charge.

■ Types of open source communities

Developer community	**- Main activities -** (1) Develops OSS (2) Creates and distributes patches to fix bugs
User community	**- Main activities -** (1) Shares bug reports (2) Holds seminars and conferences to spread and promote OSS (3) Translates OSS-related documents into multiple languages

History of OSS - Birth of UNIX and the GNU project -

The following figure shows the history of OSS development. When an operating system called UNIX was created in 1969, the freedom of exchanging software started to be restricted. To copy software, people needed to obtain a license from the rights holder. In 1983, Richard Stallman established the GNU project and developd an operating system that was compatible with UNIX. He then published the source code, and allowed people to use the source code freely.
This concept (which allows users to copy software under certain conditions) is called "copyleft".

Establishment of OSS-related organizations

1998
• The OSI was established
(Open Source Initiative)

UNIX systems

1991
• Development of Linux started

1985
• FSF* established
(* Free Software Foundation, Inc.)

Free to copy (under conditions) (copyleft)

1969
• UNIX developed by AT&T and Bell Laboratories

Collaborative creation of UNIX

Free to copy

1983
• GNU declaration

OSS culture

1980s
• Proprietor of UNIX begins to charge a fee for UNIX systems

Freedom to copy

UNIX culture

The right to copy is required (copyright)

Copyleft:
  A term derived from "copyright".
  Copyleft is a concept related to copyright. It allows users to freely use, modify, and redistribute a copyrighted work, and stipulates that use, modification, and redistribution of derivative works should not be restricted.
GNU: GNU's Not Unix

1970s   1980s   1990s   2000s   2010s