

# OPEN SOURCE TUTORIAL

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*Opinions expressed herein are the opinions of the  
authors and not necessarily the opinions of IEEE.*



# Agenda

- Introduction to Open Source
  - What is Open Source?
- About Open Source
  - What is its value?
  - How is it developed?
  - How is it governed?
- Open Source at IEEE SA
  - How does open source relate to standards?
  - How is open source used in standards?
  - What are the rules at IEEE?
  - What are OS licenses and CLAs?
  - What are examples from the IEEE SA?
- Getting Started
  - How do I initiate a project?
  - How do I get onto the IEEE SA platform?
  - What does the platform offer?
- Q&A



We will be using WebEx for polls and questions

**Please log in to WebEx if you would like to participate**

# PART I: ALL ABOUT OPEN SOURCE

# Open Source means different things to different people

- **A way of thinking** “about how people collaborate within a community to achieve common goals and interests.” (<https://www.theopensourceway.org/>)
- **A way of licensing** that “allows software to be freely used, modified, and shared.” (<https://opensource.org/licenses/>)
- **A Parallel Universe of Applications:** Linux/Android, LibreOffice, Big Blue Button, Mattermost, Etherpad, Odoo, ...
- **An open consensus process** that allows potential competitors to work together towards an end that benefits them all.

# Open Source has many types

Individual

Community

Corporate

Foundation

Government

## Open Source Archetypes:

A Framework For Purposeful Open Source

moz://a



## Table of Contents

[https://blog.mozilla.org/wp-content/uploads/2018/05/MZOTS\\_OS\\_Archetypes\\_report\\_ext\\_scr.pdf](https://blog.mozilla.org/wp-content/uploads/2018/05/MZOTS_OS_Archetypes_report_ext_scr.pdf)

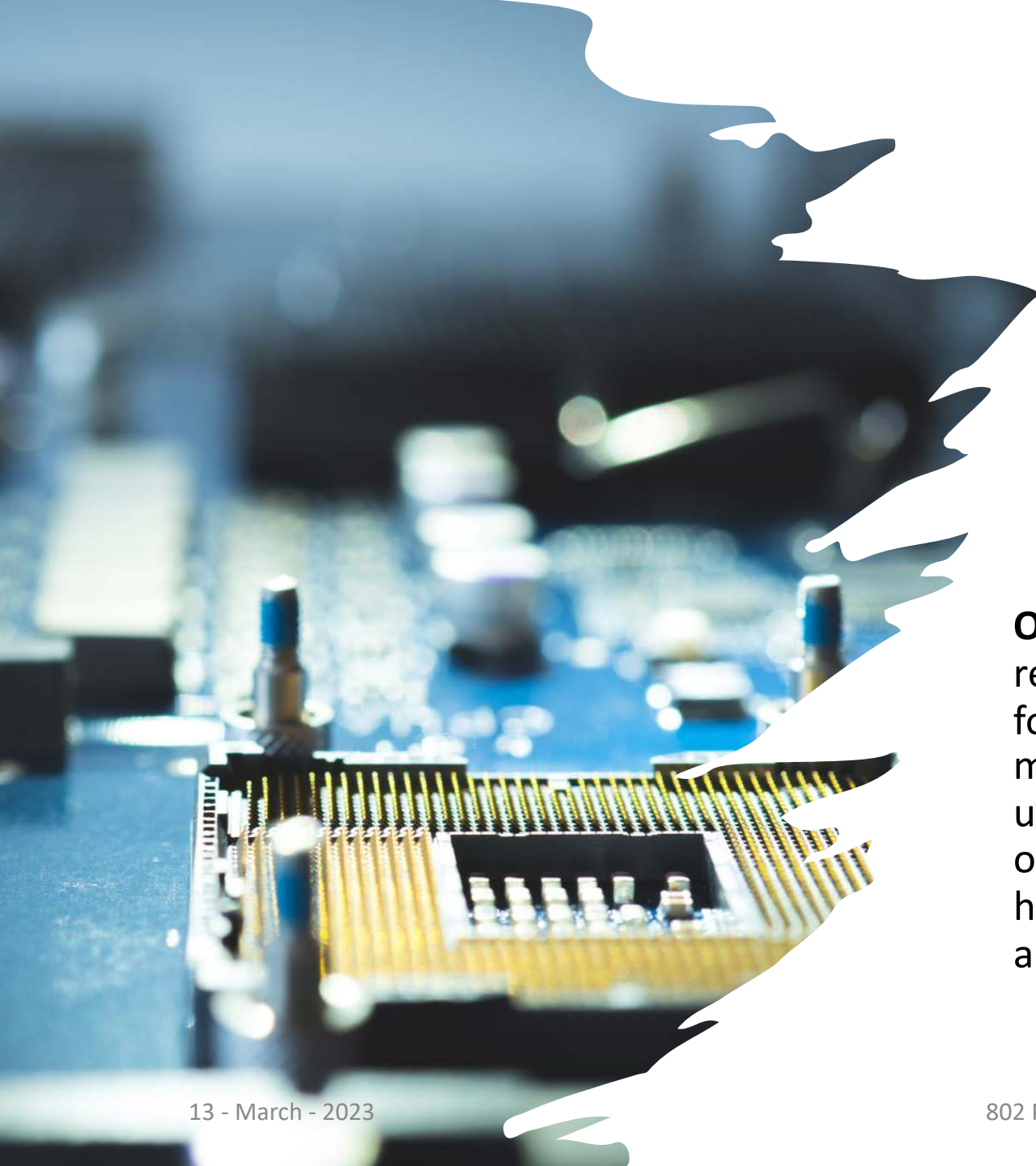
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802 Plenary Open Source Tutorial



PERMISSIVE





## Definition from the IEEE SA Open Source Committee (OSCOM) Operations Manual

**Open Source** is a digital work for which the human-readable source code is available—in the preferred form for making modifications—for use, study, re-use, modification, enhancement, and re-distribution by the users. Open Source applies to software, hardware, and other artifacts, which may include computer code, hardware designs, data, documentation, documents, and other digital objects.



## Which raises three questions

- How does it help me (purpose)?
- How is it developed (process)?
- How is it governed (policies)?



# Purpose

## General

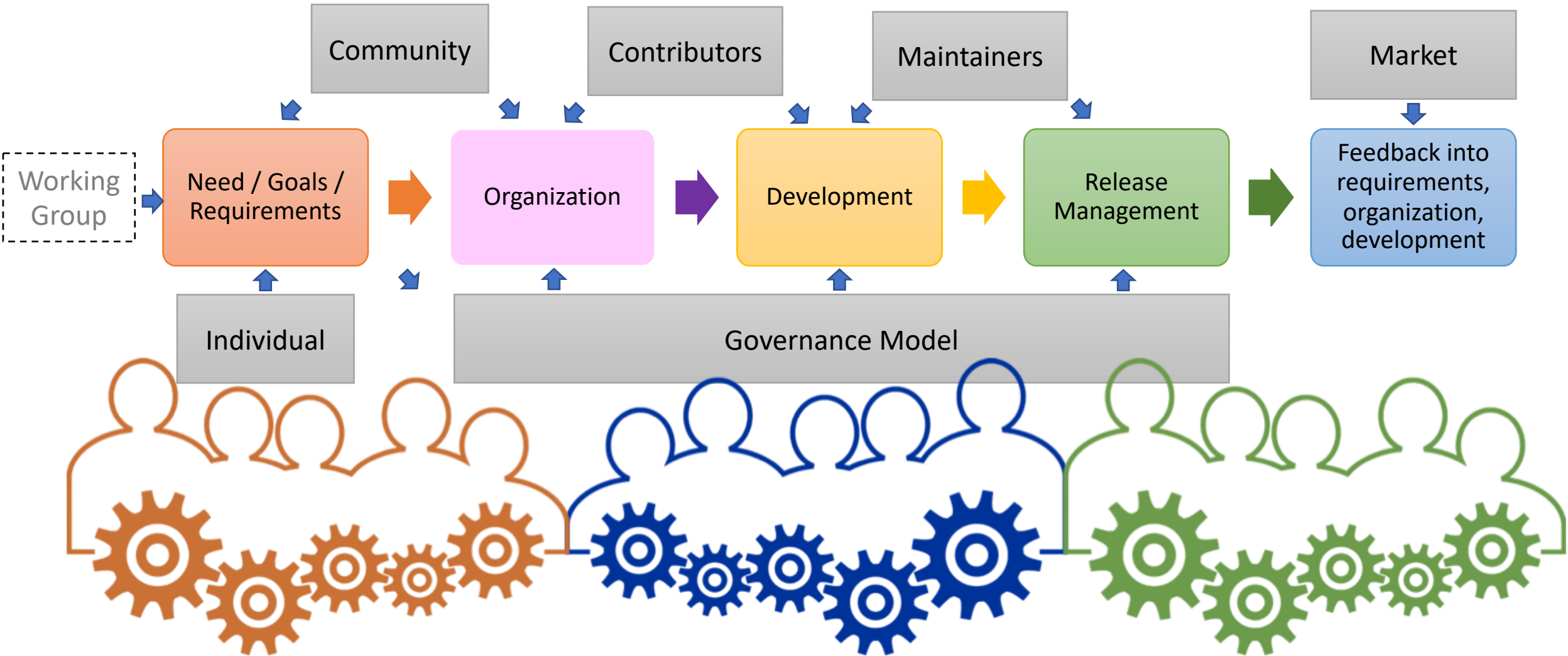
- **Quality**
  - Consensus = better outcome
  - With enough eyes all bugs are shallow
- **Cost**
  - Shared expense
  - Low overhead
- **Agility**
  - Divide and conquer
  - React to market quickly
- **Impact**
  - Low (or no) barrier to adoption
  - Public distribution channels

## For Standards

- **Inclusion**
  - Experimentation during standards drafting
  - Normative & Informative Code in Standard
- **Adoption**
  - Reference implementations
  - Marquis applications
  - Open documentation
- **Conformance**
  - Conformance testing apps
  - Public review process

Examples will come later!!

# Process





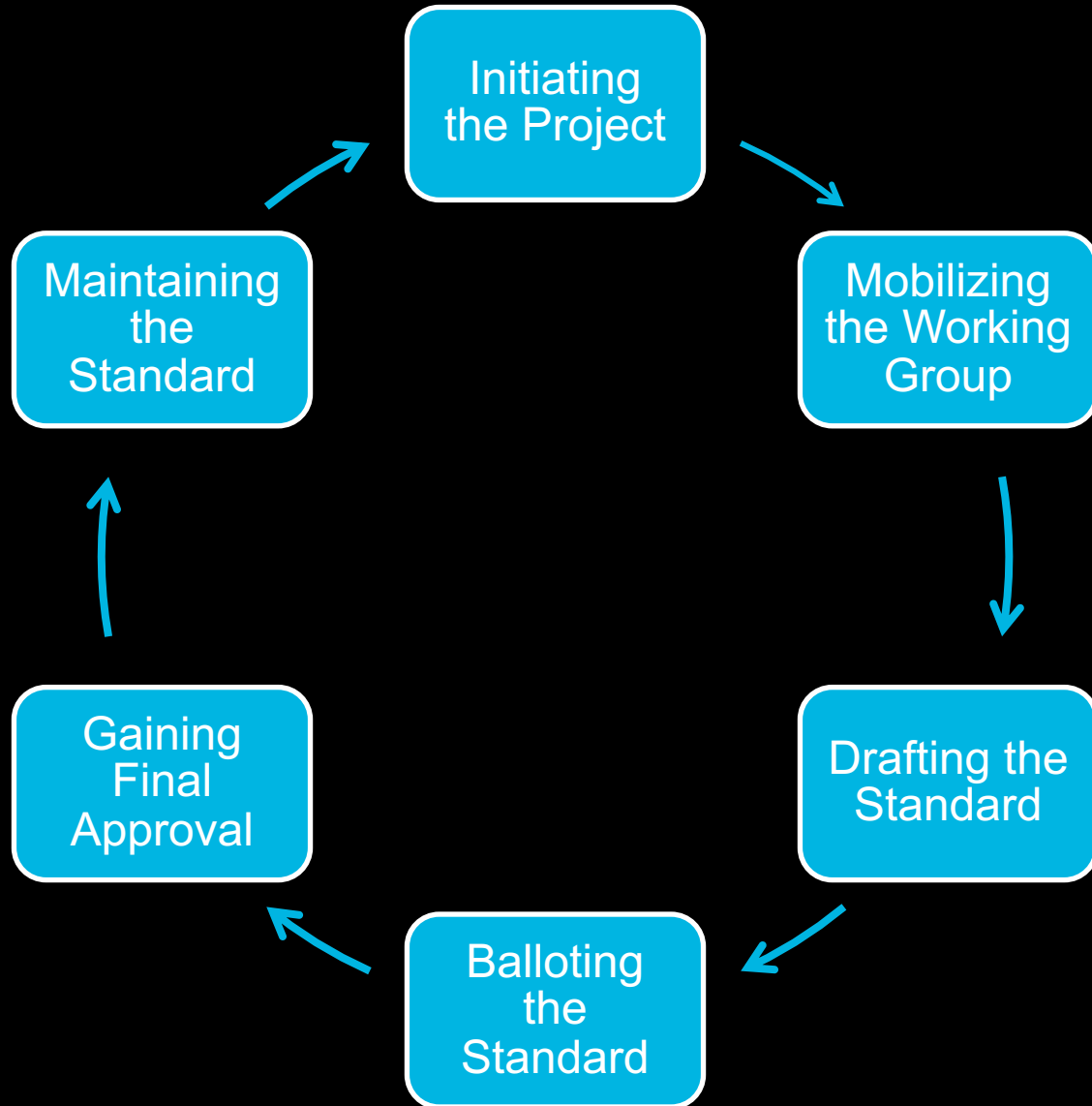
# Policies

- General
  - Charter
- Legal (Will discuss later)
  - License
  - Contributor License Agreement(s)
- Organizational
  - Leadership
  - Committees (e.g. Steering Committee)
- Operational
  - Contributing
  - Code of Conduct
  - Issues
  - Workflows
- Decision-making
  - Commits
  - Role criteria
  - Project Approvals

Note: This is all prescribed for Open Source that are incorporated into IEEE Standards!

## Part II: Open Source at IEEE SA

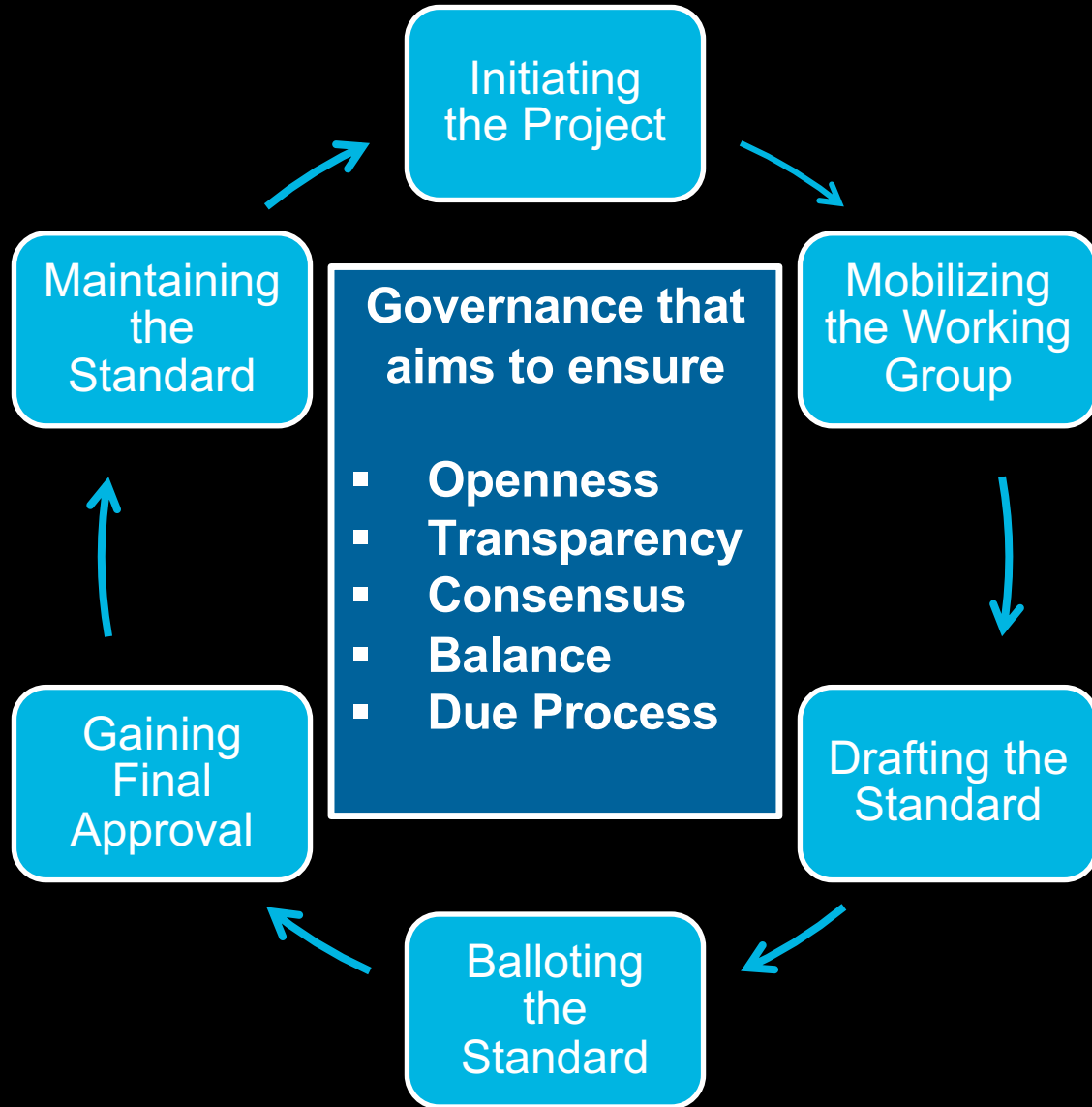
Policies, Procedures, and Practices



# Similarities to Standards Work

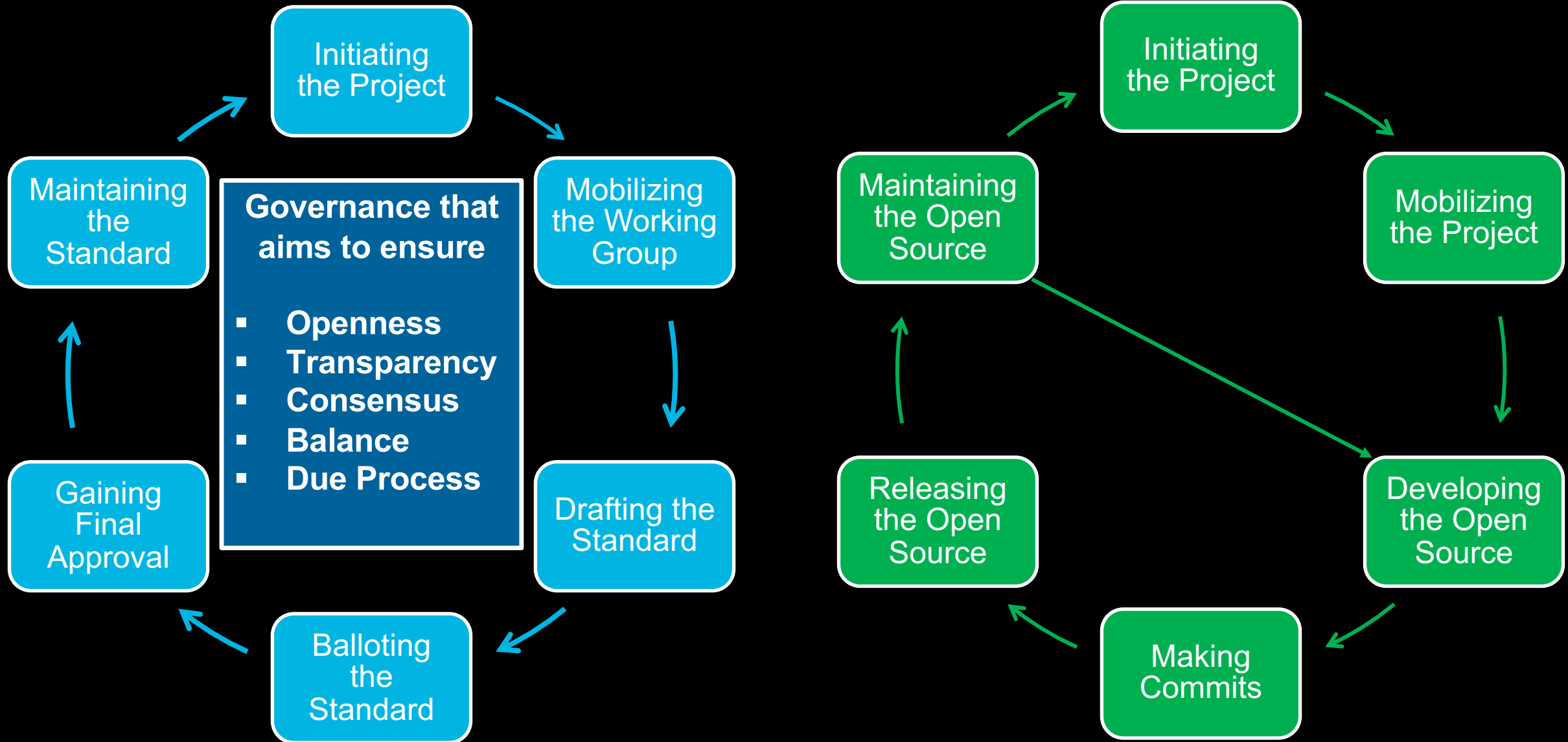
**IEEE SA**

## Standards Development

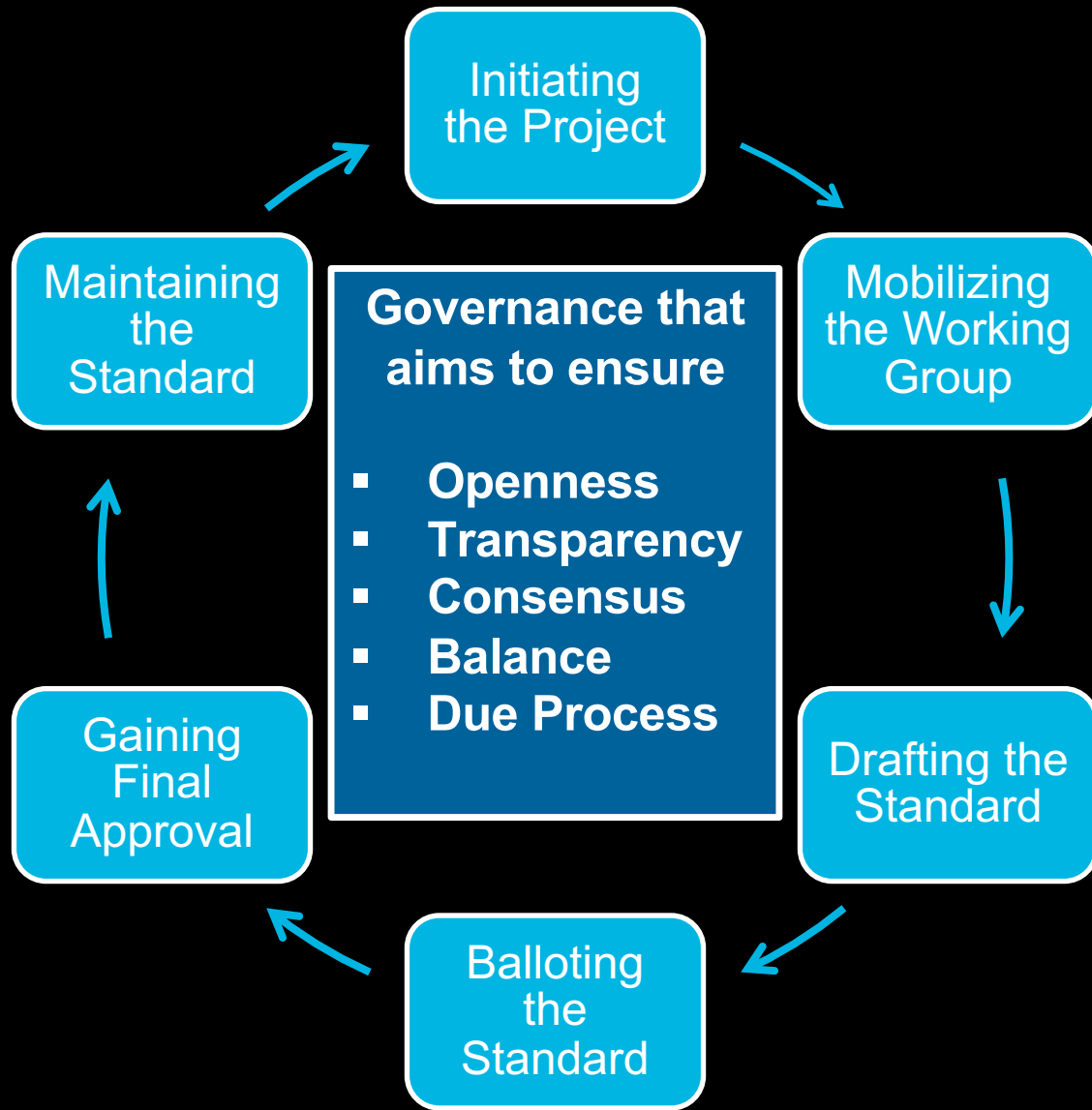


# Standards Development

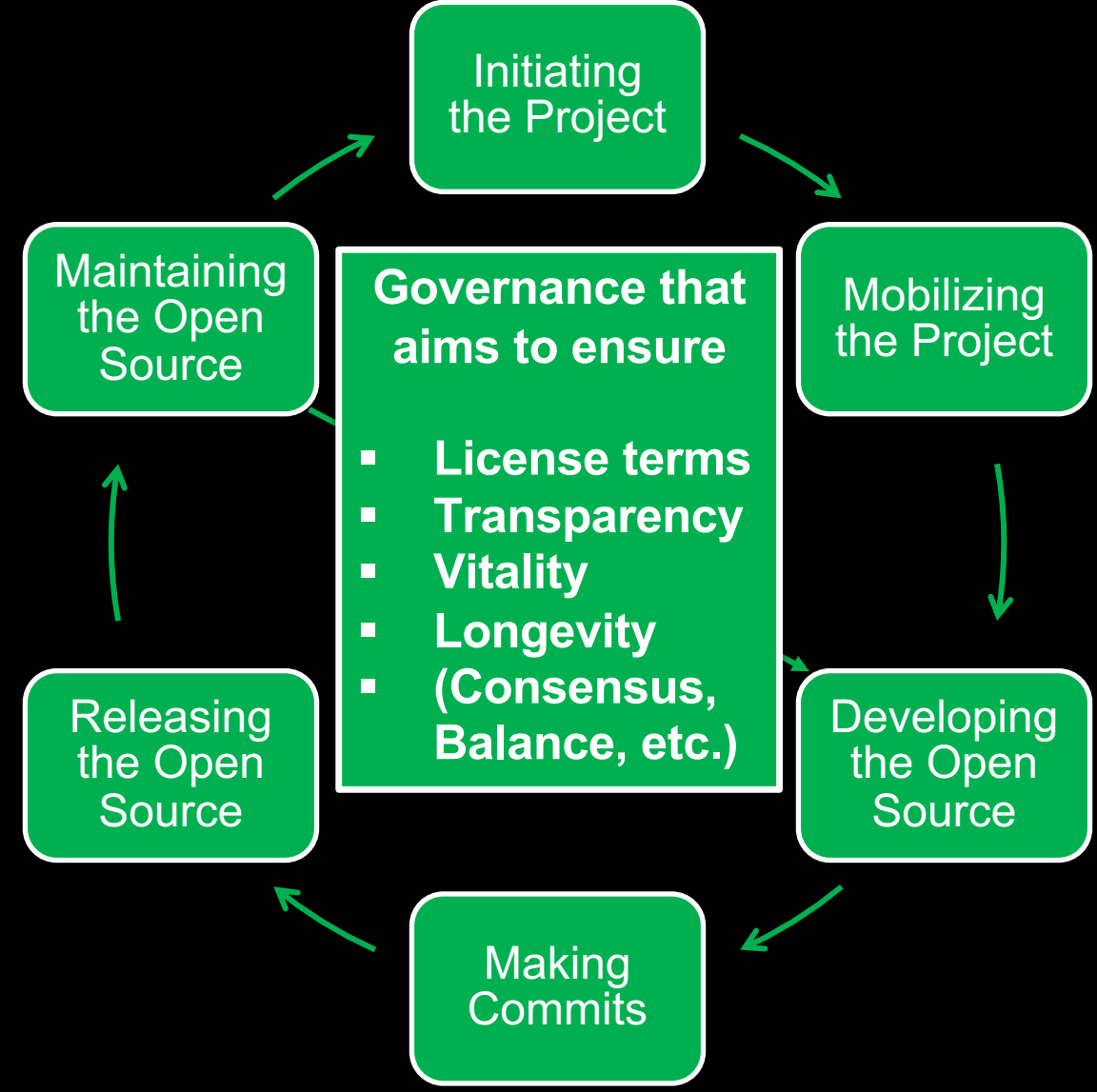
# Open Source Development



# Standards Development



# Open Source Development





# Standards Development

**Policies, Procedures, Processes, Platform**



**Governance that aims to ensure**

- Openness
- Transparency
- Consensus
- Balance
- Due Process

**Key Actors:** Interested Industry, WG Chair, WG Members, Balloting Group, IEEE SA Boards, Committees & Staff

# Open Source Development

**Policies, Procedures, Processes, Platform**



**Governance that aims to ensure**

- License terms
- Transparency
- Vitality
- Longevity
- (Consensus, Balance, etc.)

**Key Actors:** Interested Community, Project Lead, Maintainers, Committers, IEEE SA Boards, Committees & Staff

## SA Open Tiers of Projects

- Tier 1: Individual
- Tier 2: Group
- Tier 3: IEEE Branded
- Tier 4: IEEE Standards
- Tier 5: Joint with IEEE Society / Council



# Incorporating Open Source in IEEE Standards

- **Refencing:** Library within a specified project in a specified code repository
- **Versioning:** May reference
  - A Specific version\*
  - The most current version
  - No version (called “undated”)
- **Informative or Normative?**
  - Both are acceptable
  - Standard shall indicate which
  - *Normative is discouraged, unless required for accuracy, functionality, safety, security, or compatibility.*
- **Development**
  - Open Source subgroup under SC or WG
  - Subgroup led by Project Lead
  - Project lead shall be officer
  - Must have at least one Maintainer
  - Patent policy still applies
- **Approval Process (RevCom):**
  - SC/WG reviews updates
  - Open Source Project Lead must be member of comment resolution group
  - Mandatory coordination with Open Source Community manager & IPR Staff

\*Can be replicated in the text of Standard.  
Non-specific versions cannot.

# I guess we better talk about licenses

IEEE SA has authorized the use of three licenses:

- [BSD Three-clause](#) (Simple and **permissive**)
- [Apache 2.0](#) (**Permissive** with copyright protection and broader applicability)
- [CERN Open Hardware License](#) (A family of three hardware licenses)

The Two Software Licenses are “Permissive”  
The CERN Licenses range in permissiveness  
**But what does that mean?**

**The presenters are not lawyers!** The content here represents their personal views only. Do not rely on it for legal advice.

# Ask ChatGPT ...



What is a permissive license?



A permissive license is a type of software license that allows users to freely use, modify, and distribute software with few or no restrictions, as long as they meet certain conditions. Permissive licenses are sometimes referred to as "BSD-style" or "MIT-style" licenses.

Permissive licenses generally provide more flexibility than copyleft licenses, as they do not require that any resulting derivative works be licensed under the same terms. Instead, permissive licenses typically only require that any copyright notices and license terms be included in any distributed copies of the software.

Examples of permissive licenses include the MIT License, the BSD License, and the Apache License. These licenses are often used for software libraries, frameworks, and other components that developers want to share with others without imposing many restrictions on their use or modification.

Copyright licenses such as the GNU Public License (GPL) are considered to be *viral* and not business friendly



What is a copyleft license?



A copyleft license is a type of open-source software license that allows users to freely use, modify, and distribute the software, but with the condition that any derivative works or modifications must also be licensed under the same terms. This means that any changes made to the software must be released under the same copyleft license, ensuring that the software remains open source and freely available to everyone.

The most common copyleft license is the GNU General Public License (GPL), which was created by the Free Software Foundation. Other popular copyleft licenses include the Mozilla Public License (MPL) and the Affero General Public License (AGPL). Copyleft licenses are often contrasted with permissive licenses, which allow users to modify and distribute the software without requiring that any changes be released under the same license.

We're on a roll  
so ... Let's ask  
about CLAs  
too!

IEEE SA has developed a [general CLA](#) that  
can be used with all licenses.



Please explain what a CLA is in the style of William Faulkner



Now, the CLA. It's a document, you see, that folks sign when they want to contribute to a software project. It's got all sorts of legal jargon in it, enough to make a man's head spin. But that's just the start of it. See, the CLA, it's a binding agreement, a pact between the contributor and the project owners. It says that the contributor grants the project a license to use their contributions, but also that they won't sue the project if anything goes wrong. It's a bit like a marriage, you might say - a solemn vow between two parties, for better or for worse.

Now, some folks might think that the CLA is a bit of a hassle. They might grumble about having to sign something so complex just to contribute to a project. But in my experience, it's worth it. The CLA ensures that everyone is on the same page, that there are no misunderstandings or legal squabbles down the line. It's like a fence around a property, keeping everything neat and tidy.

Of course, there are always those who will try to skirt around the rules. They might try to contribute without signing the CLA, or they might try to sneak in some code that they don't have the rights to. But the CLA is a powerful tool, a shield against such mischief. With a well-written CLA, you can be sure that your project is protected from all manner of legal shenanigans.

So, my advice to you is this: if you're working on a software project, make sure you've got a solid CLA in place. It may seem like a hassle at first, but in the long run, it's well worth the effort. After all, as my grandpappy used to say, an ounce of prevention is worth a pound of cure.

# How is this being used Today? An Example...

## **IEEE 1076-2019 - VHDL (hardware description language)**

<https://opensource.ieee.org/vasg/Packages>

This open source project is both normatively and informatively referenced from IEEE 1076, the standard that defines hardware description language, VHDL. The normative references to this open source project are "undated"/"unversioned" meaning that updates to the open source project can be made by the working group after the approval and publication of the standard.

This open source project provides:

- Complex, low-level data structures and header functions required when creating software that can interpret VHDL
- Extensive test-suites to test the functionality and low-level language properties of VHDL (these test-suites are fed into the IEEE SA Open Platform's Continuous Integration automated testing pipelines).
- UML diagrams documenting the flow of data and defined functions

# Another Example...

## **P1918.1.1 - Standard for Haptic Codecs for the Tactile Internet**

<https://opensource.ieee.org/haptic-codecs>

Tactile technology is the integration of multi-sensory triggers within physical objects, allowing "real world" interactions with technology. Its ranges are broad, and include metaverse/AR applications, but also span many other industries, including retail clothing, smart homes, art, gaming, and more. To allow for tactile technology to be internet-enabled in devices, there is a need for rapid encoding and decoding of tactile and haptic data between sensors/devices and networks (e.g., 5G networks).

The P1918.1.1 open source reference software is informatively referenced from the draft standard developed by P1918.1.1 Std. It provides encoding and decoding for kinesthetic and tactile functionality for coding haptic data (such as tactile vibration data) to and from bitstreams. Example C++ codecs are provided as well as interactive tools written in matlab (+ matlab codebooks) that are used for exploring data that adheres to this standard.

## Part III: Using the platform

The public site is at [saopen.ieee.org](https://saopen.ieee.org).

The actual site is at [opensource.ieee.org](https://opensource.ieee.org).

The manual is at [opensource.ieee.org/community/manual](https://opensource.ieee.org/community/manual).

The OSCOM Operations Manual [here](#) in pdf format.

<https://opensource.ieee.org/oscom/projects>



# The Development Platform



The development platform is a version of GitLab.



You need to have an IEEE login to access it. It does not cost anything.

When you start a project you can



- Automate security scans
- Setup a container
- Setup a CI/CD pipeline
- Add a Mattermost group

New project > Create blank project

Project name

Demo Project X

Project URL

https://opensource.ieee.org/

Pick a group or namespace

Project slug

demo-project-x

Want to organize several dependent projects under the same namespace? [Create a group.](#)

Visibility Level ?

Private

Project access must be granted explicitly to each user. If this project is part of a group, access is granted to members of the group.

Internal

The project can be accessed by any logged in user except external users.

Public

The project can be accessed without any authentication.

Project Configuration

Initialize repository with a README

Allows you to immediately clone this project's repository. Skip this if you plan to push up an existing repository.

Enable Static Application Security Testing (SAST)

Analyze your source code for known security vulnerabilities. [Learn more.](#)

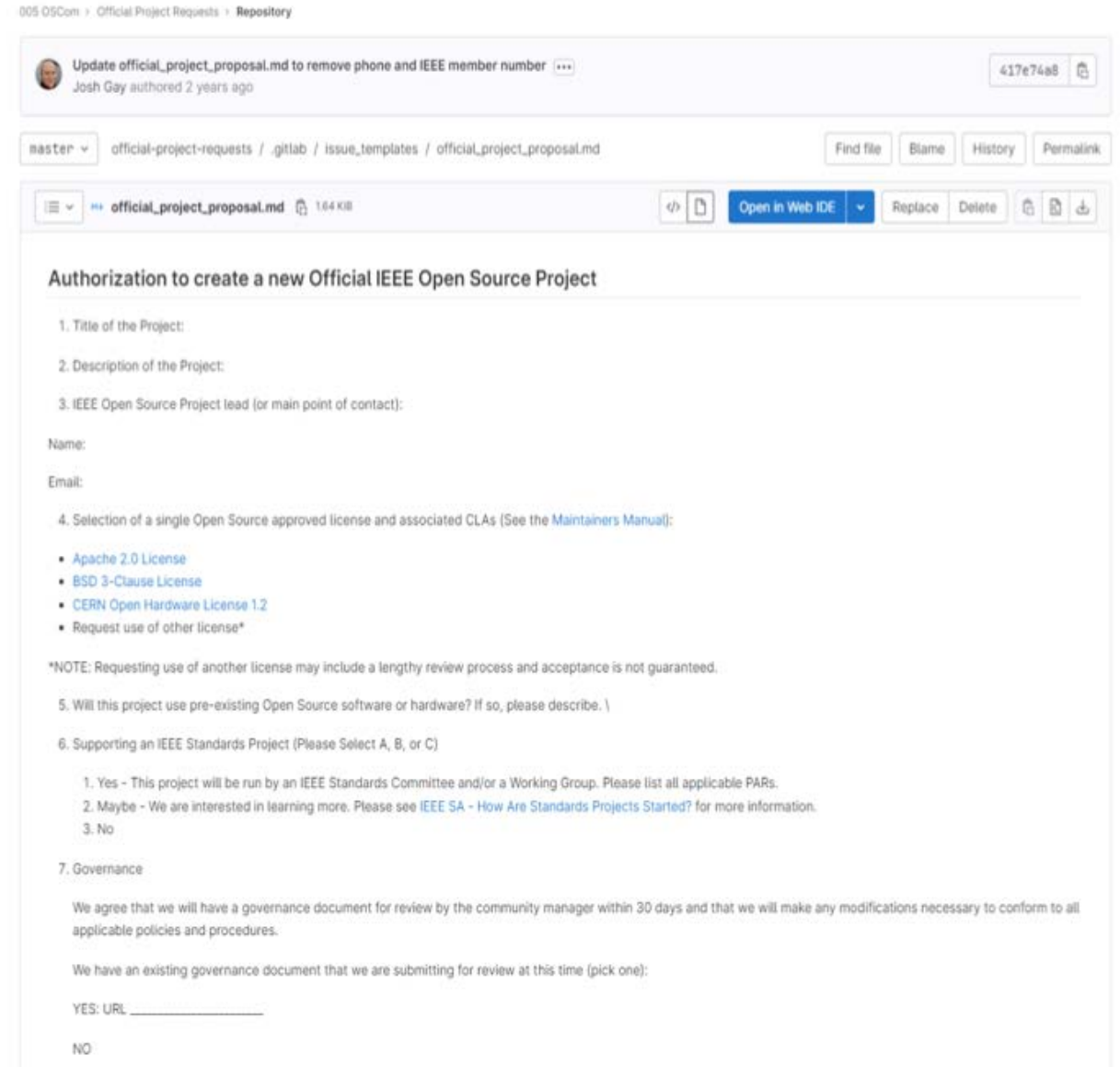
Create project

Cancel

# Starting Projects

- Start a Tier1 or Tier2 project on your own.
- Tier 3 (supported) and Tier4 (standards-related) projects need OSCOM approval.
- OSCOM requests are [GitLab Issues](#).
- Talk with the community manager before [submitting an OSCOM](#).
- OSCOM will ask you to present your request using a template slide deck (next).

<https://opensource.ieee.org/oscom/official-project-requests/>



005 OSCOM > Official Project Requests > Repository

Update official\_project\_proposal.md to remove phone and IEEE member number ...  
Josh Gay authored 2 years ago 417e74a8

official-project-requests / .gitlab / issue\_templates / official\_project\_proposal.md

official\_project\_proposal.md 1.64 KiB

### Authorization to create a new Official IEEE Open Source Project

1. Title of the Project:
2. Description of the Project:
3. IEEE Open Source Project lead (or main point of contact):  
Name:  
Email:
4. Selection of a single Open Source approved license and associated CLAs (See the [Maintainers Manual](#)):
  - Apache 2.0 License
  - BSD 3-Clause License
  - CERN Open Hardware License 1.2
  - Request use of other license\*

\*NOTE: Requesting use of another license may include a lengthy review process and acceptance is not guaranteed.
5. Will this project use pre-existing Open Source software or hardware? If so, please describe. \
6. Supporting an IEEE Standards Project (Please Select A, B, or C)
  1. Yes - This project will be run by an IEEE Standards Committee and/or a Working Group. Please list all applicable PARs.
  2. Maybe - We are interested in learning more. Please see [IEEE SA - How Are Standards Projects Started?](#) for more information.
  3. No
7. Governance  
We agree that we will have a governance document for review by the community manager within 30 days and that we will make any modifications necessary to conform to all applicable policies and procedures.  
We have an existing governance document that we are submitting for review at this time (pick one):  
YES: URL \_\_\_\_\_  
NO

# Recent OSCOM Activity

IEEE.org | IEEE Xplore Digital Library | IEEE Standards | IEEE Spectrum | More Sites

IEEE SA OPEN Search GitLab

005 OSCOM > Official Project Requests > Issues

Open 1 Closed 23 All 24

Search or filter results... Created date

Issue Title	Issue ID	Created	By	Status	Comments
P2881 Learning Metadata Standard for Open Source	#24	Jan 19, 2023	Andy Johnson	CLOSED	2
Official Project Proposal for 'Cyber Ontology'	#23	Dec 8, 2022	James Schoening	CLOSED	1
Official Project Proposal for 'Common Core Ontology'	#22	Dec 8, 2022	James Schoening	CLOSED	1
Request Open Source Platform for IEEE P1918.1.1 Project	#21	Oct 27, 2022	Xiao Xu	CLOSED	0
SystemVerilog IEEE Std 1800 Open Source material	#20	Dec 8, 2022	Tom Fitzpatrick	CLOSED	4
IEEE 1451.0 Open Source Repository	#18	Oct 13, 2022	Riccardo Brama	CLOSED	4

# Project Request Presentation Template

# IEEE SA Open Source Committee (OSCom)

## Open Source Project Request

Title:

OS Project Lead/POC:

# Instructions

- Use this deck to present a request for approval of a Tier 3, 4 or 5 project\* to the IEEE SA Open Source Committee (OSCOM).
- The formal project request is made via the project request form submitted as an issue on the SA Open GitLab platform. **This deck is used to walk the committee through the project request and explain the context and choices made in the formal request.**
- When there is space on a slide for data from the formal request, please cut and paste the data from that request.
- **Please keep explanations concise and jargon-free** and do not assume that OSCOM members:
  - Are experts in your field,
  - Are standards developers who know every standard by its number, or
  - Are familiar with the technology that you are trying to create.

## \*Definitions of Tiers

**Tier 3** Open Source Projects reviewed and approved for use of the IEEE Open Source Platform by OSCOM to create IEEE Open Source Releases or products.

**Tier 4:** IEEE Open Source Projects incorporated into IEEE standards—IEEE Open Source Projects operating in conjunction with an SASB authorized standards Project.

**Tier 5:** Joint IEEE Open Source Projects—IEEE Open Source Projects that are operating in conjunction with another IEEE Board or Organizational Unit and are also subject to the policies and procedures of that Board or Organizational Unit

# PROJECT TITLE AND RELATED STANDARDS

---

**Open source project title:**

**Related standards project (if applicable):**

- **PAR number or standard number:**
  - **Scope statement:**
- 
- **Explanation of what the standard does:**

# Project description

---

**What open source will be developed:**

**Why this is valuable:**



# RELATION TO EXISTING OPEN SOURCE

---

**Relation to known open source:**

**Description of pre-existing open source that will be used (if any):**

# GOVERNANCE

---

**Requested license (and reason):**

**How will the project be governed?**

# SUMMARY

---

**Summary of the project and your questions for oscom:**

**Review of the formal project request:**

## Create new group



### Create group

Assemble related projects together and grant members access to several projects at once.



### Import group

Import a group and related data from another GitLab instance.



## Create group

Groups allow you to manage and collaborate across multiple projects. Members of a group have access to all of its projects.

Groups can also be nested by creating [subgroups](#).

**ⓘ You're creating a new top-level group** ✕

Members, projects, trials, and paid subscriptions are tied to a specific top-level group. If you are already a member of a top-level group, you can create a subgroup so your new work is part of your existing top-level group. Do you want to create a subgroup instead?

[Learn more about subgroups](#)

New group > Create group

### Group name

SA Open Tutorials




Must start with letter, digit, emoji, or underscore. Can also contain periods, dashes, spaces, and parentheses.

### Group URL

https://opensource.ieee.org/ sa-open-tutorials

### Visibility level

Who will be able to see this group? [View the documentation](#)

-  Private  
The group and its projects can only be viewed by members.
-  Internal  
The group and any internal projects can be viewed by any logged in user except external users.
-  Public  
The group and any public projects can be viewed without any authentication.

### Mattermost

- Create a Mattermost team for this group  
Mattermost URL: <https://opensource-connect.ieee.org/>

Create group

Cancel

## Create new project



### Create blank project

Create a blank project to store your files, plan your work, and collaborate on code, among other things.



### Create from template

Create a project pre-populated with the necessary files to get you started quickly.



### Import project

Migrate your data from an external source like GitHub, Bitbucket, or another instance of GitLab.

You can also create a project from the command line. [Show command](#)



## Create blank project

Create a blank project to store your files, plan your work, and collaborate on code, among other things.

New project > Create blank project

### Project name

### Project URL

/

### Project slug

Want to organize several dependent projects under the same namespace? [Create a group.](#)

### Visibility Level [?](#)

Private

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Analyze your source code for known security vulnerabilities. [Learn more.](#)

Create project

Cancel



Project 'Demo Project X' was successfully created. ✕

D

Demo Project X 🔒Project ID: 776 🔒

☆ Star 0



Fork 0

↔ 1 Commit 1 Branch 0 Tags 61 KB Project Storage

Configure SAST in '.gitlab-ci.yml', creating this file if it does not already exist  
Robby Robson authored just now

e7fc2524



main ▾

demo-project-x /



Find file

Web IDE



Clone ▾

README

CI/CD configuration

Add LICENSE

Add CHANGELOG

Add CONTRIBUTING

Auto DevOps enabled

Add Kubernetes cluster

Configure Integrations

Name	Last commit	Last update
.gitlab-ci.yml	Configure SAST in '.gitlab-ci.yml', creati...	just now
README.md	Initial commit	just now

README.md

## Demo Project X

### Getting started

To make it easy for you to get started with GitLab, here's a list of recommended next steps.

Already a pro? Just edit this README.md and make it your own. Want to make it easy? [Use the template at the bottom!](#)

### Add your files

- [Create or upload files](#)
- [Add files using the command line](#) or push an existing Git repository with the following command:

```
cd existing_repo
git remote add origin http://opensource.ieee.org/ssa-open-tutorials/demo-project-x.git
git branch -M main
git push -uf origin main
```

saopenupdate

Robby Robson • saopenupdate • Jobs • #3839

Project information  
Repository  
Issues  
Merge requests  
CI/CD  
Pipelines  
Editor  
Jobs  
Schedules  
Security & Compliance  
Deployments  
Packages and registries  
Infrastructure  
Monitor  
Analytics  
Wiki  
Snippets  
Settings

passed Job test triggered 1 minute ago by Robby Robson

```

1 Running with gitlab-runner 15.8.2 (4d1ca121)
2 on gitlab-runner-564bb8dbcd-mlz94 fwULd62M, system ID: r_rXg0qQ0136W8
3 Preparing the "kubernetes" executor
4 Using Kubernetes namespace: gitlab-managed-apps
5 Using Kubernetes executor with image node:18.12.1 ...
6 Using attach strategy to execute scripts...
7 Preparing environment
8 Waiting for pod gitlab-managed-apps/runner-fwulde2n-project-777-concurrent-0p86rc to be running, status is Pending
9 Running on runner-fwulde2n-project-777-concurrent-0p86rc via gitlab-runner-564bb8dbcd-mlz94...
10 Getting source from Git repository
11 Fetching changes with git depth set to 20...
12 Initialized empty Git repository in /builds/robby/saopen.1eee-saopen.org/.git/
13 Created fresh repository.
14 Checking out 4484bc9a as robby-master-gatch-63455...
15 Skipping Git submodules setup
16 Executing "step_script" stage of the job script
17 $ npm install
18 npm WARN ERESOLVE overriding peer dependency
19 npm WARN While resolving: react-server-dom-webpack@0.0.0-experimental-c8b778b7f-20220825
20 npm WARN Found: react@18.2.0
21 npm WARN node_modules/react
22 npm WARN   react@"18.2.0" from the root project
23 npm WARN 11 more (@gatsbyjs/reach-router, gatsby, gatsby-link, ...)
24

```

```

155 | src/pages/turn-server.tsx
156 | | /turn-server/
157 | src/pages/upcoming-events.tsx
158 | | /upcoming-events/
159 | src/pages/workshop.tsx
160 | | /workshop/
161 | src/pages/workshop1.tsx
162 | | /workshop1/
163 | src/pages/workshop2.tsx
164 | | /workshop2/
165 | src/pages/workshop3.tsx
166 | | /workshop3/
167
168
169 | (SSG) Generated at build time
170 | D (DSG) Deferred static generation - page generated at runtime
171 | ∞ (SSR) Server-side renders at runtime (uses getServerData)
172 | λ (Function) Gatsby function
173
174
175 info Done building in 45.871235374 sec
176 Cleaning up project directory and file based variables
177 Job succeeded

```

(SSG) Generated at build time  
D (DSG) Deferred static generation - page generated at runtime  
∞ (SSR) Server-side renders at runtime (uses getServerData)  
λ (Function) Gatsby function

## Other Tools

- <https://saopen.ieee.org/mattermost/>
- <https://saopen.ieee.org/bigbluebutton/>
- <https://docs.gitlab.com/ee/user/markdown.html>



## Part IV: Discussion and Q&A