# Introduction

This document is intended to give a member’s overview of the RISC-V technical organizations. The intended audience is both for new members as well as a reference for existing members.

A lot of this information is scattered in different places. We will point at relevant other documents as appropriate.

If you have any questions on anything, please send an email to [help@riscv.org](mailto:help@riscv.org).

## URL Table

All information links with URLs will be kept up on the [tech wiki](https://wiki.riscv.org/display/TECH) (which is also available from a pull down on riscv.org)

All references in this document will refer to the above table (URL Table) to get to URLs so that this document is easier to keep up. If the URL table moves, we will put a redirection from the above address to get to a new one.

If there is a URL that has content already, the URL table will point at that page and the reader may have to choose another link to get to where they want to be.

# Principles

## Code of Conduct

RISC-V is a community organization and it only works if we all respect each other. Our official [**Code of Conduct**](https://riscv.org/community/community-code-of-conduct/) is posted on the RISC-V website, including an escalation process.

But our goals for interaction go beyond the code of conduct. We must understand that our community is diverse including different cultures, genders, race, etc. We expect people to be thoughtful about everything from word choice, tone of voice, time zones, etc.

If you feel like you have seen or been the recipient of intimidating or inappropriate behavior, resolving it can be either clearing up any miscommunication or misunderstood or uncategorized or poor incidents, or following the code of conduct instructions to escalate the issue.

Nothing is too small.

We hope that members entering this organization behave constructively. We ask that members don’t get defensive if asked to adjust interactions or behaviors.

We strongly suggest that you don’t let frustrations build over a series of incidents. The earlier we address issues, the easier it will be to be productive in a positive environment.

## Sharing work with the community

One of the reasons for the community is so that the members do not have to replicate the same or similar work in each company. This helps time to market as well as maintenance.

If you have proprietary value please, by all means, keep it proprietary. But if the technology is a common industry offering or something developed in a RISC-V venue or email, we ask all members to consider contributing their work as early as possible for the benefit of the community the same way that all members benefit from others doing the same.

In the Linux community, the desire is that time to market is not considered proprietary value even if it provides some advantage to members.

You can find a slide deck discussing the RISC-V open source position [here](https://docs.google.com/presentation/d/1dGbY16JFEYgjdlvJoDwXMDdwNz_sdCT_WrPLzGmzsRg/edit?usp=sharing).

## Innovation enablement

One major goal of RISC-V is to enable innovation.

To that end all specifications and extensions will be constructed in such a way to enable members to innovate both in the implementation of standard extensions (those defined by RISC-V International) and in member-defined extensions.

Where possible we will require splitting up extensions so that implementers can implement portions of an overall extension (consisting of potentially a number of extensions) swiftly and efficiently.

## Balance between for profit and not for profit

## We work to enable both for profit and not-for-profit research and products based on RISC-V. There is often overlap with proprietary and Open Source components. Our intent is to provide robust Open Source components but still enable for profit companies to innovate and differentiate their products. This is often a fine line and we look to our members to help navigate this topic.

## Implementation vs. non-implementation dependent topics

RISC-V International supports and enables the full ecosystem around the RISC-V ISA from industry requirements to design to Applications and everything in between. However we only host extensions, the development of specifications, ecosystem components, and interest groups that are implementation independent.

We work to ensure that whatever is done at RISC-V International also endeavors to enable innovative implementation dependent work.

We fully support and often build alliances with organizations that are non-profit and filling out other parts of the ecosystem. A link can be found in the URL Table.

## Fewer things better and more completely

As a philosophy we would, where we can, ask that members concentrate on finishing what we have started rather than have a lot of things in flight that we take a long time to finish.

The number one responsibility of a Task Group is to define their deliverables, project an end date and finish their deliverables.

We also ask that members look at topics holistically and not only look at single point extensions.

One example, The Code Size Optimization SIG is being chartered to provide oversight for all code reduction and performance topics. Some they may do themselves with a specification and extension. Some may already be covered by another TG. Some may be done by spawning new TGs. Ultimately, however, that SIG is responsible for identifying everything needed for Code Size reductions across RISC-V including identifying gaps (or spawning a group to do so on its behalf).

Another example is the Industries or Verticals Standing Committee. It may spawn, for example, an Automotive SIG which in turn may interoperate with or spawn TGs that are responsible for creating extensions and specifications for topics the Automotive industry requires to be successful. Interoperate may mean cross representation between the groups and developing requirements that will influence the charters and results from other TGs.

## Accountability and Micromanagement

On a periodic basis all groups hosted in RISC-V international will need to provide status and projections.

We will ask each group to project when they will reach the Plan, Freeze and Ratification-Ready Milestones (See [Extensions Lifecycle](https://docs.google.com/presentation/d/1nQ5uFb39KA6gvUi5SReWfIQSiRN7hp6z7ZPfctE4mKk/edit?usp=sharing)). This includes all of the items listed in the Definition of Done [policy](https://docs.google.com/document/d/13mCiwJFiGvoQoLnk78HFUJrxxaOvbPeWBL2ktSGAY5s/edit?usp=sharing) and [checklist](https://docs.google.com/spreadsheets/d/1UL6F6ahNwFO69fecLJtnpZatx_PkS-Gdcvb8DdWhWUk/edit?usp=sharing).

We ask that members do not reverse engineer their answers. In particular don’t say something isn’t needed because you think you know we don’t have the resources to do the work. Instead we ask that you identify what is the right thing to do. The TSC and Chairs will work to identify resources and we allow exception requests. See the policies link in the [Wiki](https://wiki.riscv.org/display/TECH).

We are a non-profit and don’t judge individual groups for being late but we do need to know projections for a number of reasons including: enabling the Chairs, TSC, and BOD to help unblock issues (resource or otherwise) causing the delay, and we need to share our status so the Governance bodies and the community so they know what to expect (one reason is that for example a member may choose to use an unratified specification to create product if a spec won’t be available for a long time in the future).

## Sense of urgency - Divide and Conquer

RISC-V international has a sense of urgency to finish specifications and extensions.

As such we ask that TGs break down extensions where it makes sense so a) members can get to market with much needed features that match the ratified extensions and specifications (and not just drafts) and b) so that implementers don’t need to implement all features in a group potentially causing a larger size and/or complexity) or worse yet create a custom extension with a subset.

This may translate into a phased approach of focusing first on developing an extension providing the key functionality that is needed, and deferring other work to separate follow-on extensions that provide expanded or complementary functionality addressing further or more specialized needs.

Similarly, TGs should strive to avoid feature creep and last minute additions to an extension. The focus should be on the core functionality that is needed, and functionality that is not essential to this goal should be deferred to follow-on extensions.

Addition of new functionality (including instructions, registers, or CSRs) after an extension has achieved Freeze status is notably undesirable and results in loss of that status.

TGs will be able to create an abbreviation for a group of extensions that go together. Please see the chapter on extension names in the unprivileged specification (see the specifications link in the [Wiki](https://wiki.riscv.org/display/TECH)).

## Open Source

RISC-V favors Open-Source Licenses (OSL) that are unencumbered and have no side-effects (i.e. no Copy-Left). Contributions must have this kind of license where applicable. Existing upstream components with other OSL licenses should maintain them as appropriate. Questions as to whether something qualifies, should be directed to help@riscv.org.

RISC-V will maintain 3 logical groupings (Still in discussion):

* Open-source License with no encumbrances or side effects
* Open-source License with encumbrances or side effects
* Closed source

We want to make sure we have a place for people to post what they wish to the community.

We partition it this way so there is not confusion by members.

Members should always inspect what they use regardless of this policy. Please see the github policy [here](https://docs.google.com/document/d/1TdUWp-OUIQjsWgip7bRfhZBuUC64Upf5eyfBj7fWd_Q/edit?usp=sharing).

## Timezone friendly

We have members in all timezones. When you plan meetings please be respectful and find a time acceptable to your group members and if necessary switch off between times that are friendly around the world. There is no time that will be easy for every timezone so please be flexible. ALso the same times are interesting for all the groups so please coordinate between teams. There is a common calendar [here](https://calendar.google.com/calendar/embed?src=c_sumcgd4h4k09ktuppmqjb27o1s%40group.calendar.google.com&ctz=America%2FLos_Angeles).

## Diversity

Diversity and inclusion are important to RISC-V International. Please identify opportunities to increase our diversity wherever you can. This includes outreach to members falling into a diversity group for chair/vice-chair positions, membership, review solicitation, and general communications.

## Commercial enablement

While we are an Open Source community, our goal is to enable members to create successful businesses that include RISC-V based technology. This may be using RISC-V as the main processor in a system or embedded as a controller on a peripheral or IO cards or DV or Toolchain products, etc.

RVI has a number goals for working with commercial vendors: 1) educate them around RISC-V and 2) analyze gaps that vendors need that RVI is not currently addressing 3) provide the exchange for publicizing products (see the exchange [here](https://riscv.org/exchange/)).

# Governing Group Structure and Responsibilities

See the organization slides [here](https://docs.google.com/presentation/d/1eEVuu6lRZd9iiDnZQSZME7Q7svtTG3pGIKHPmZ79B8E/edit?usp=sharing).

## Extensions

## What are they?

Extensions are a group of instructions and state (registers, CSRs) and the behaviors for those instructions and state. The extension is defined by a specification (or chapter in a specification) and a formal model in SAIL. Extensions are governed and approved by the TSC and ratified by the board of directors and extensions along with their corresponding task groups are governed by their committee and their charter is governed and approved by TSC.

An extension has a name. The name is governed, allocated and approved by the Unprivileged SC and appears in a chapter in the Unprivileged specification. Extension names may be individual alphabetic letters or may begin with a Z<string> for RISC-V extensions and X<string> for custom vendor specific extensions.

Ratification groups contain a number of extensions and are sent for ratification together (e.g. Zks and Zbk).

Instructions may exist in multiple extensions. It is best to think of extensions as a Macro. It is important to define them so we can speak about their ratification, or in advertising or for compiler flags, etc.

Both instructions and state have a format. The instruction format and its constituent parts (e.g. opcode) and state and behaviors are governed, allocated and approved by the Unprivileged IC and Privileged IC and appear in a chapter of the appropriate specification.

Once RISC-V ratifies an extension, it cannot change. Additions or changes require a new extension.

A full description of extensions is under development and will be available soon (currently the most comprehensive discussion is in chapter 26 of the unpriv specification found [here](https://riscv.org/technical/specifications/)).

A list of extensions (and their inclusion in profiles) is currently in the extension names tab of the [status spreadsheet](https://docs.google.com/spreadsheets/d/1qzu6b9kgADGjaa5fd1Qla7b9gCMOaEnGO5bUVu2oPys/edit?usp=sharing). Our intent is to place these in a database which will be the single reference for instructions, extensions, ratification groups, profiles, etc.

## Extensions lifecycle

Extensions have a lifecycle and milestones. Please see the extensions slides [here](https://docs.google.com/presentation/d/1nQ5uFb39KA6gvUi5SReWfIQSiRN7hp6z7ZPfctE4mKk/edit?usp=sharing) for details.

## Status

Each Committee or Task Group should bring any announcements or issues to Chairs via email and may request that those items be added to the agenda. Chairs meetings are weekly on Wednesday at 8am PT.

Each Committee or Task Group should update the specifications status at least once per month in the specifications spreadsheet 24 hours before the monthly TSC meeting. The TSC meeting is the first tuesday of each month at 8AM PT. The status spreadsheet is [here](https://docs.google.com/spreadsheets/d/1iDXsvDhu8uRtiss0YazlioBBEV9Jrq_o01E59QdmkE0/edit?usp=sharing).

In addition, the CTO may request a further update before the BOD meeting with notice.

## Issues and Task tracking

There are a number of ways to raise and track issues or ask questions or have discussions, minutes and charters within SCs, TGs, SubCs, and SIGs (collectively referred to as Groups):

* Github issues tracking
* Groups.io email groups
* Jira

The following are preferred (not required) ways to use these tools:

* Specifications issues from within a TG or SubC - Github issue
* Cross-group specification issues - Jira ticket
* Group specific questions within a group - Groups.io email
* All other questions - email to help@riscv.org
* Escalations - email to help@riscv.org
* Milestone blockers - email to help@riscv,org

Use your best judgement and we will move the discussion to the correct venue as appropriate. Over time Groups may move their customs as appropriate to that Group.

# Ratification Packages

# Profiles

# Platforms

# Specifications

## Definitions

All terms just be defined before use. Do not assume that your understanding of the meaning of a term is self-evident or common knowledge.

Terms include but are not limited to:

* Industry terms
* RISC-V terms
* Instructions
* registers
* CSRs
* Fields

Please include the terms in the index and glossary as appropriate (see below).

## Copyrights

Please follow the copyright conventions for RISC-V International which can be found in the URL table.

## Attribution

If you refer to something that requires attribution (trademark, copyright, etc.) please do so. If you think something needs attribution but you don’t know what it should be please add the following text at the location “<ATTRIBUTION TBD>”. All attribution TBDs must be resolved before the Freeze Milestone.

## Format

### Asciidoc

We have settled on Asciidoc as our common documentation format. Please see the policy for documentation.

## Conventions

TBD (Krste to fill in or tell us who can)

### index enabling

Required indexing:

* Terms
* Tables
* Topics

Optional indexing:

* Term usage (found in a definition index)
* Examples
* Rationale
* Best Practices

The technique for indexing within Asciidoc can be found at:

<https://asciidoc.org/userguide.html#_indexes>

### Cross-document Glossary enabling

We intend to autogenerate glossaries and therefore need specification writers to identify terms and their definitions that should be in the glossary. Most of the items identified in the index section above should appear in the glossary.

How to create a glossary entry: TBD (I Couldn't find this).

### Buildable to PDF

#### Nightly build capable

### Version publishing

#### Current (may be evolving or ratified/approved)

#### Last Stable

## ISA vs. non-ISA

* + 1. ISA specifications include instructions or state in a separate document or a chapter in the Unprivileged or Privileged Specifications as governed by the corresponding SCs.
    2. Non-ISA specifications refer to items that do not change instructions or state. TGs or SubCs may develop multiple specifications or impact other specifications where some are ISA and some are not. An example here might be Crypto that could influence the B extension, has unique instructions in its own Z extension, and have a Best Practices guide for how and when to implement and use these instructions effectively.
    3. Please label the specification or chapter or appendix as appropriate (e.g. if you are putting your best practices in a separate document then mark it with a title or subtitle that says Non-ISA document).

## Rationale

Everyone is required to provide the rationale for an extension, part of an extension, or change (see policies).

Groups should include both rationale for the overall specification content as well as for specific pieces of content.

Rationale can appear in a delineated box within a specification proper (i.e. intermingled with instruction or state definitions), in an appendix or separate document as appropriate.

Please title the rationale with “Rationale: <what you are provided rationale for>”.

## Best Practices

The best practices may appear in the same way as Rationale as described above. Please use the Title “Best Practice: <what you are providing a best practice for>”.

Best practices could include guidance for chip developers, os developers, application developers, etc. Please Identify for whom the best practice is for at the beginning of the best practice text (e.g. “Best practice for Linux developers”).

## Suggested Minimal Viable Implementation

Groups may choose to specify this in order for the RISC-V community to be competitive with their products. Please follow the same guidelines as seen in the Rationale section above except identify the text with “Suggested minimum viable implementation:”. This is different from best practices because it is being established as a specific low bar. It may also appear as a portion of a best practice.

# Profiles and Platforms

* 1. Profiles

Profiles are a collection of extensions used

# Operations

## Calendar (Google Calendar)

See the URL table.

## Video conferencing (Zoom)

See the URL table

## Email group lists (lists.riscv.org, google groups)

See URL table. Note that there are two sets of mailing lists.

* Working groups - task groups, committees, and governance groups - are hosted on the members-only Member Portal, found at https:/lists.riscv.org (hosted by groups.io)
* Public discussion groups are hosted on google groups, and include the ISA-DEV and SW-DEV groups. These groups are used for comments and discussion during public review periods.

Note that per the RISC-V membership agreement, all technical contributions to the specifications come through

## Files

### Open Source Unencumbered vs. Copyleft vs. Closed Source

We want to support our community publishing all kinds of content but we want to make sure it is easy for our community to differentiate between content with different licensing and copyright requirements.

Please see the URL table for the Github repositories.

### Groups.io

This site was previously used for calendaring, file storage, charter location, and email groups.

We have moved calendaring to Google Calendar and File storage to one of Google Drive and/or Github.

See the URL Table for links to various features.

### Github

See the open source section above.

### Google drive

We have a shared google drive for RISC-V members. The content includes but not limited to: Information, Planning, Status, Policies, Tutorials, Chairs, …

The link is available in the URL Table.

## Messaging

Many members use email and email groups (from Groups.IO) to communicate. We also provide access to slack if you so choose (see URL Table).

## Wiki

RISC-V working groups sometimes use the Github wiki to store relevant information. Here are some notes from Andy Glew on the subject:

How to search this wiki, repo, issues, etc.

https://github.com/riscv/riscv-CMOs/wiki/How-to-search-this-wiki%2C-repo%2C-issues%2C-etc.

HOW-TO: search wiki on GitHub

https://1drv.ms/u/s!AsM0rpNELR4xgQm9sCzSiwsl\_KjJ?e=y13EDA

NOTE we will soon be encouraging all projects to migrate to the new Confluence wiki (<https://wiki.riscv.org>)

## Issue tracking

### Github

### Jira

## Voting

Votes

# Legal

## IP usage policy

## IP prior art policy

# Getting Help

## General

## Code of Conduct

## Information

### Web Page with Links

## IT

## Questions

### General or unknown target

### Task group specific