

# C and C++ Compatibility Study Group

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## Summary of Changes

WG14 N2627/P2274R0

- Original proposal

## Introduction and Rationale

This study group is comprised of WG14 (C) and WG21 (C++) committee members who are interested in the common intersection between these two languages. It is unique to both committees in that the study group bridges both ISO working groups. Members coming from one committee might be unfamiliar with the culture, procedures, and expectations of the other committee. This document gives some background information to people coming from one committee or another and will hopefully make clear what the expectations and procedures are within this joint study group.

## Important Information

You can sign up for the study group mailing list at: <https://lists.isocpp.org/mailman/listinfo.cgi/liaison>

The study group mailing list address is: [liaison@lists.isocpp.org](mailto:liaison@lists.isocpp.org)

The study group chair can be reached at: [compatibility.sg.chair@gmail.com](mailto:compatibility.sg.chair@gmail.com)

## WG21 Experts

WG21 experts may be surprised to learn how operations within WG14 differ from what they're used to. Some of the highlights are:

- WG14 is a smaller committee compared to WG21. Attendance at WG14 meetings is usually around 20 people or so. Because of the size of the committee, all work is performed in plenary rather than splitting off into working groups. There are also fewer study groups in WG14, and the study groups always meet outside of committee meetings.
- The usual process for adopting a proposal in WG14 is for the whole committee to consider a proposal at a meeting and provide feedback to the author, who then revises their document and submits it again at a subsequent meeting. Eventually, the paper will either be adopted at a meeting or the proposal will explicitly fail to motivate the committee to make a change.
- WG14 emphasizes the entire space of C implementations rather than the most common implementations, including “niche” implementations like ones that target small devices or specialized hardware.
- WG14 has a charter that details the principles the committee operates under. The current charter can be found in [WG14 N2086](#). WG14 attempts to adhere closely to the charter, so including information in your papers about how it meets chartered expectations is a good idea. Furthermore, if your paper proposes something that does not meet the guidelines in the charter, your paper should call this out explicitly with rationale as to why you feel the charter does not apply (and be prepared to defend your argument).

- WG14 does not usually adopt inventive proposals. An inventive proposal is one which does not have at least *two* implementations in common use (commercial, open source, etc.) The committee does not typically find implementations in a fork of a compiler or other less-used source to count as an implementation, but WG14 does consider standardization with C++ to count as one of the implementations.
- Features in WG21 sometimes intentionally break backwards compatibility with older versions of C++, and so there is an Annex listing such situations in the standard. WG14 makes every attempt to not break *any* existing code. When considering a proposal's impact on C, take special care to use reserved or potentially reserved identifiers for the feature and explicitly call out any backwards compatibility concerns that may exist, even if the issue would not typically cause concern within WG21.
- There is not a working group within WG14 to help write standards text. Wording discussions frequently happen offline or on the mailing list reflectors and less frequently during the meeting itself. Redrafting a paper for additional review during a meeting is not typical because the committee often will not discuss a paper unless it appeared in a meeting mailing.
- The next release for the C language is expected to be 2023. The current WG14 ship schedule can be found at [WG14 N2610](#).

## WG14 Experts

WG14 experts may be surprised to learn how operations within WG21 differ from what they're used to. Some of the highlights are:

- WG21 is a larger committee than WG14. WG21 meetings often have more than 250 people attending. Because of the number of attendees, WG21 does little work in plenary and instead splits off into various working and study groups that typically run concurrently during the week of the committee meeting. There are four primary working groups (two focused on evolution of C++ and two focused on wording of the standard) and numerous study groups.
- The usual process for adopting a proposal in WG21 is a pipeline. Proposals often start out either in an Incubator group (for nascent ideas) or a study group appropriate for the topic. Once that group is happy with the proposal, the proposal is moved along to the next most relevant study group or evolutionary working group. Eventually, the proposal will be seen by one of the wording working groups who help the author prepare the words for inclusion in the standard. Finally, the proposal is voted on in an official WG21 plenary.
- Because WG21 has working groups dedicated to helping proposal authors write the actual standards text for their proposal, proposals that will be seen by this study group may lack proposed standards text.
- WG21 does not have a charter per se, but there is a document detailing the [policies and procedures](#) of the committee and the [aspirational goals](#) set by the direction group that may provide useful background information.
- WG21 finds implementation experience with a proposal to be incredibly valuable but does not have any requirement on implementation experience to adopt a proposal.
- WG21 tends to focus implementation experience around a handful of the most popular C++ implementations with the assumption that less popular implementations will eventually follow suit. Some examples of C++ implementations that WG21 considers especially important include: Clang, GCC, Microsoft Visual Studio, and EDG.

- WG21 tries to limit breaking changes when introducing a new feature but has some (generally unwritten) rules around when it's acceptable to break user code. This means that WG21 cares about backwards compatibility in a way that may feel unfamiliar to someone coming from WG14.
- The next release for the C++ language is expected to be 2023. The current WG21 ship schedule can be found at [P1000](#).

## Guiding Principles

These are the guiding principles we want members of the study group to follow:

0. Respect one another. Everyone in the study group is here because they're passionate about some aspect of the intersection between C and C++ and we should always be interacting professionally and in good faith. This study group will follow the following official guidance from both committees:

[The ISO Code of Conduct](#)

[The IEC Code of Conduct](#)

[The WG21 Practices and Procedures, and Code of Conduct](#)

1. Respect the efforts of both committees. While study group members may only be thinking about their paper as it relates to one committee in particular, we should conduct ourselves as if we're members of *\*both\** committees even if that isn't officially the case.
2. Help bridge gaps. Group members are not always going to be able to champion their papers in both committees, or be familiar with how both committees operate, or how to write standards text appropriate for both standards, and other activities. Offer to help bridge those gaps whenever possible.

## Policies

### Paper Submissions

Because this is a study group, all papers discussed within the study group must be made available to both WG14 and WG21. Further, because the group is using the [WG21 document tracking system](#) to track the progress of all proposals within the study group, all documents eventually need to end up in the WG21 system.

WG21 members should submit papers through the [document submission system](#) as normal and mark the audience as being "SG22 C and C++ Compatibility", with no further action required to submit to WG14. The SG22 chair will create an omnibus paper that is submitted to the WG14 document tracking system and lists all of the WG21 proposals that have been submitted to the study group.

WG14 members should submit papers to the WG14 document tracking system as normal and alert the WG14 convener that the paper does not need to be discussed by the plenary committee (unless such discussion is warranted). Then, the paper should be additionally submitted to the [WG21 document submission system](#) with the audience marked as being "SG22 C and C++ Compatibility" to ensure that it makes it into the study group's document queue. If you have questions about how to get an account or how to submit a document, please contact the study group chair at [compatibility.sg.chair@gmail.com](mailto:compatibility.sg.chair@gmail.com).

## Citations

WG14 and WG21 both have used the ISO N-number system for referring to documents. This can cause some confusion because there is overlap between the document numbers. For instance, N1943 could either refer to [WG21 N1943](#) on garbage collection or it could refer to [WG14 N1943](#) on \_\_LINE\_\_ and \_\_FILE\_\_ behavior in macro replacement lists. For this reason, please cite all N-numbered documents with an explicit committee designation (as demonstrated in the previous sentence) to avoid confusion. This confusion does not exist with non-N-numbered documents as WG21 uses P-numbered documents while WG14 is planning to use C-numbered documents.

## Guidance to the wider committees

This study group does not have the authority to instruct either committee on whether to adopt a given proposal; we do not have veto power. Instead, we either support a proposal and refer it to the working or study group that should see it next or we give guidance on how to improve the proposal to the point we feel we can support it.

## Quorum and Determining Consensus

Given that the study group is a joint group between two committees of vastly differing membership numbers, it is important to determine quorum and consensus in a way that doesn't heavily skew towards the larger of the two sets of participants. Quorum can only be achieved if there are at least two members from each committee present (members who regularly attend both committees count as a member of each committee, chairs and co-chairs do not count for quorum). Consensus is determined at the discretion of the chair, but committee membership of the vote participants is crucial to determining consensus. For this reason, straw polls will be taken by working group membership. This means that each straw poll is run twice, once for WG14 members and once for WG21 members. People who are members of both committees may vote on both polls. Consensus is determined only if both straw polls have consensus.

## Meetings

Given the nature of the study group's relationship to both committees, the study group will primarily hold virtual teleconferences to make progress on proposals to ensure that members from both committees are able to attend. If a meeting is held face-to-face, it must have a dial-in option to allow for remote participation. An agenda covering the list of papers being discussed will be sent out in advance of all meetings. If you think your paper will require more than 30 minutes of time for discussion or for any other schedule-related concerns, please contact the group chair to discuss (before the meeting agenda is distributed).

To make the best use of committee time, there is an expectation that group members will come prepared to discuss the papers on the meeting agenda so that paper authors can hopefully spend less time bringing the group up to speed on a given proposal and spend more time on technical discussion and consensus building. Please use the study group mailing list to raise concerns about a proposal that don't require full group discussion or email the authors directly for editorial issues.

## Acknowledgements

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