



ISO/IEC JTC 1 "Information technology"
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SC 22 Business Plan 2023

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Description

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Business Plan for JTC 1/SC 22

Programming languages, their environments and system software interfaces

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1.0 Executive Summary

SC 22 continues to operate well. While some WGs' membership and marketplace relevance are in decline, other WG memberships are on the increase. All are operating in a manner appropriate to their needs.

WGs continue to monitor and to improve support for new[er] technologies, such as concurrency, multi-core parallelism (homogeneous and heterogeneous), high-performance computing, and object-oriented and other methodologies, while taking into account educatability and error avoidance.

SC 22 holds its Plenary on an annual basis, typically several weeks prior to the November JTC 1 plenary. Between plenaries, formal business is carried out via letter ballots, and informal business is carried out via teleconferences and email. All committee documents are posted on ISO Documents. At most, two WGs meet in conjunction with the plenary.

2.0 CHAIR'S REMARKS

2.1 Market Requirements, Innovation

The classic programming languages, for which SC 22 is well known, remain popular with major development work going on in Ada, C, C++, COBOL, Fortran, and Prolog. Interest continues in the WG documenting vulnerabilities of various programming languages. Operating system work is also progressing, in Linux and POSIX.

Newer languages tend to develop their standards using an open-source model, with both the work-in-progress and the final product publicly available for free on Github or similar sites. The ISO/IEC business model precludes this. Consequently, it remains difficult to attract new languages, because they would lose the openness expected by their communities.

2.2 Accomplishments

This varies widely from one WG to another, from little activity besides DR processing in some, to high activity in others.

2.3 Resources

The C and C++ language WGs continue to have high participation, both in the number of members and NBs. The same is true for the WG documenting vulnerabilities of various programming languages. Participation in the other active WGs ranges from barely adequate to good.

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2.4 Competition and Cooperation

None of SC 22's projects have direct competition, and most WGs have active cooperation with related groups in their respective industries.

2.5 Issues to bring to JTC 1's Attention

The new restrictions on free availability are causing substantial disruptions of the 24772 series of documents. If a document was previously freely available, and its scope has not expanded, new editions should continue to be freely available to avoid disruptions to the user community and to the groups that develop the documents.

ITTF's attempt to reject paragraph numbers impacts many SC 22 standards and technical specifications that have published with paragraph numbers for decades. Customers of SC 22 standards depend on paragraph numbers to cite specific requirements within documents. We have submitted a proposal for JTC 1's consideration that would require ITTF to allow these documents to continue their use of paragraph numbers in the publication stage.

3.0 Working Groups

3.1 WG 4 — COBOL

Development and maintenance of ISO/IEC Standards and Technical Reports related to programming language COBOL.

COBOL remains one of the widely-used programming languages for both new development and enhancement of existing applications.

3.1.1 WG 4 Accomplishments

- Published a revision of the COBOL language standard.
- Began a new revision cycle for the language standard.

3.1.2 WG 4 Deliverables

- 2023-01 ISO/IEC 1989 - COBOL

3.1.3 WG 4 Risks, Opportunities, and Issues

- Further decline in resources. Most of the personnel for the technical work have retired. The U.S. COBOL Committee, INCITS PL22.4, which did much of the technical work, was disbanded.
- Some of the relatively new experts are quite active in the standardization process.

3.2 WG 5 — Fortran

The development and maintenance of ISO/IEC Fortran programming language standards.

Fortran is the language of choice for much scientific, engineering, and economic programming, particularly for very large programs that have evolved over many years.

3.2.1 WG 5 Accomplishments

- Submitted FDIS for revision of ISO/IEC 1539-1 - Fortran.

3.2.2 WG 5 Deliverables

- 2023-10 ISO/IEC 1539-1 - Fortran

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3.2.3 WG 5 Risks, Opportunities, and Issues

- WG 5 tries to anticipate technical comments and address them before a ballot occurs, but unexpected comments can delay the planned schedule.

3.3 WG 9 — Ada

Development and coordination of ISO standards and Technical Reports for Programming Language Ada. Ada is the language of choice for important parts of the real-time, embedded systems community as well as aerospace and defense segments. For example, all the on-board (embedded) software in the Cassini spacecraft, orbiting Saturn since 2004, is written in Ada. Ada is also being used in other market segments, such as railway and banking.

3.3.1 WG 9 Accomplishments

- Published the fourth revision of ISO/IEC 8652, the Ada standard.
- Worked on Defect Reports on ISO/IEC 8652.
- Completed the ADA and SPARK parts of WG 23's TR 24772.
- Initiated project for ISO/IEC AWI TS 24718 (Ed 1), Guidance for the use of the Ada Ravenscar Profile in high integrity systems, currently in Preparatory stage. This is a conversion of a TR to a TS.

3.3.2 WG 9 Deliverables

- ISO/IEC 8652, Ada.
- Continue to address Ada Defect Reports.
- Resolve issues with updating TRs that are no longer allowed to be TRs because of a change in ISO policy regarding documents that provide guidance.
- Continue moving WG 9 materials from their former IEEE home to ISO Documents.

3.3.3 WG 9 Risks, Opportunities, and Issues

- Possible delays if unexpected technical comments are received during ballot.
- Travel funding for some participants has disappeared, though they can participate remotely.
- With the increased interest and concern with software and systems safety, WG 9 intends to continue working with WG 23 on the development of guidance to the prevention of software vulnerabilities.

3.4 WG 14 — C

Development and maintenance of ISO/IEC Standards related to the programming language C.

3.4.1 WG 14 Accomplishments

- Submitted a DIS for its revision of IS 9899, part of which included incorporating portions of TS 18661 into the C standard.
- Submitted a DTS for TS 6010. This was rejected by ITTF; discussion follows under risks.
- Has a study group to investigate incorporating additional portions of TS 18661 into a future edition of the C standard, and to prepare for updating TS 18661 Parts 4 and 5 to the 2019 IEEE floating-point standard.

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- Has a joint study group with WG 21 to coordinate proposals between the two languages.
- Has a study group exploring the possibility of providing a better categorization of undefined behavior.

3.4.2 WG 14 Deliverables

- 2024-07 Revision of ISO/IEC 9899 - Programming Language C.
- 2024-09 TS 6010 on Pointer Provenance.

3.4.3 WG 14 Risks, Opportunities, and Issues

- ISO/CS has become a greater risk to customers of WG 14 deliverables than ever before. In addition to continually-increasing arbitrary demands upon volunteer editors over the past several years, the following new areas have caused critical instability that undermines WG 14's ability to address marketplace needs.
 - ISO/CS has ruled that an easy-to-read tracked-changes-like format for technical specifications describing new language features will not be accepted. This has introduced a delay of several months in the development of TS 6010, as well as other SC 22 deliverables.
 - ISO/CS is pressing for the abandonment of JTC 1 Standing Document 23, which would revoke the ability to conduct an open dialog with the community through the public availability of certain documents. The current openness is crucial to ensuring that WG 14's work is in line with the marketplace. It has greatly enhanced the quality of deliverables and encouraged increased national body participation.
- WG 14 is planning its first in-person meeting since the pandemic in January, 2024, and a resurgence of COVID could disrupt that.

3.5 WG 17 — Prolog

Development and maintenance of ISO/IEC standards related to programming language Prolog.

Prolog is a niche language. It is used extensively by a small number of users mainly for applications in configuration, web and CGI generation, constraint handling and natural language. It is taught in a significant number of universities.

3.5.1 WG 17 Accomplishments

- Worked on TS 13211-3 on Definite Clause Grammars (DCGs).

3.5.2 WG 17 Deliverables

- Complete the TS on DCGs.
- Begin a TS on Unicode usage in Prolog.

3.5.3 WG 17 Risks, Opportunities, and Issues

- The group is small and the health situation has made work more difficult.

3.6 WG 21 — C++

Development and maintenance of ISO/IEC Standards, Technical Specifications, and Technical Reports related to the programming language C++.

ISO C++ remains a widely-used foundation technology, well-received in the marketplace.

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Although C++ has long been a consistently popular language, since 2011 it has enjoyed a renewed cycle of growth and investment in tools and platform support across the industry. This was driven primarily by the C++11 standard's completion at the same time as the industry saw a resurgence of interest in performance-efficient, hardware-efficient, and especially power-efficient systems programming capability for mobile devices, cloud data centers, high-performance financial systems, vector and GPGPU computing (via nonstandard extensions to C++ that we are now investigating standardizing), and other major growth sectors and environments.

This new cycle of industry investment in C++ includes, but is not limited to, investment in:

- 1) tools, such as the advent of a new major C++ implementation in the Clang compiler and other major new products actively competing to fully implement the latest ISO C++ standard;
- 2) organization, with the establishment of the Standard C++ Foundation trade association in 2012 (see isocpp.org/about);
- 3) standardization participation, so that meeting attendance is regularly over 250 experts organized into over 20 active subgroups -- this includes 16 active domain-specific subgroups (e.g., transactional memory, graphics, gaming) that were established since 2012 and have drawn domain experts who did not previously participate in C++ standardization; and
- 4) faster and more predictable standardization output, with regular releases of the standard every three years along with many concurrent Technical Specifications (13 completed and published from 2014 to 2018).

3.6.1 WG 21 Accomplishments

- Submitted a DIS for the next revision of JTC1.22.14882 – Programming Language C++.

3.6.2 WG 21 Deliverables

- 2024-08 revision of JTC1.22.14882 (IS C++) and progressing other projects.

3.6.3 WG 21 Risks, Opportunities, and Issues

- ISO/CS has rejected an easy-to-read tracked-changes-like format for technical specifications that describe new language features. This has substantially delayed at least two WG 21 technical specifications as well as other SC 22 deliverables.
- COVID-19 makes meeting planning for such a large group quite difficult, but WG 21 has successfully conducted hybrid meetings since November, 2022.
- The WG has divided up into smaller meetings to cope with the need for virtual participation.

3.7 WG 23 — Programming Language Vulnerabilities

Development and maintenance of a TR series regarding “Guidance to Avoiding Vulnerabilities in Programming Languages through Language Selection and Use”

The marketplace demands robust, secure software. Vulnerabilities are the antithesis of robust, secure software. Many of the attacks on software-based systems succeed because the computer language used did not prevent the attack vector, and did not warn the developer that the code being produced contained flaws that could be used to generate attacks.

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3.7.1 WG 23 Accomplishments

- In the publication process for IS 24772 part 1.

3.7.2 WG 23 Deliverables

- TR 24772 Parts for Python, Fortran, C++, and Java.

3.7.3 WG 23 Risks, Opportunities and Issues

- Some Parts require resources within other working groups or external experts to undertake the work.
- Although editions 1 and 2 of the TRs had been available for free, the sudden change in policy prevented edition 3 from being available for free. This is a blow to the community as well as to the experts, who had only considered a new edition worthwhile if it could be distributed for free. The TRs are being converted to International Standards to recover free availability, which increases the workload and causes delays.

3.8 WG 24 — Linux

Development and maintenance of ISO/IEC standards related to the Linux operating system

Linux is the primary operating system in several major categories, from embedded systems to supercomputers.

3.8.1 WG 24 Accomplishments

- Preparing for the next revision of the 23360 series.

3.8.2 WG 24 Deliverables

- Prepare for the next revision of the 23360 series.

3.8.3 WG 24 Risks, Opportunities, and Issues

- The 23360 documents required special processing from ISO/CS because of an agreement with the Linux Foundation that allowed ISO/IEC publication of the documents.
- ISO/CS wants future editions to follow a different process, and it is not yet known how this can be coordinated between WG 24 and the Linux Foundation.