

ISO/IEC JTC 1 "Information technology"

Secretariat: **ANSI**

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SC 22 Business Plan 2021

Document type	Related content	Document date	Expected action
General document / Other		2021-10-04	COMMENT/REPLY by 2021-11-08

Description

This document is circulated for review and consideration at the November 2021 JTC 1 Plenary.

Business Plan for JTC 1/SC 22

Programming languages, their environments and system software interfaces

PERIOD COVERED: September 2020 – October 2021

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2021-10-04

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 changed, new editions should continue to be freely available to avoid disruptions to the user community and to the groups that develop the documents.

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

- Continued work on a four-year revision of the language standard. A nine-month extension has been granted (see section 3.1.3).

3.1.2 WG 4 Deliverables

- 2021-09 ISO/IEC DIS 1989 - COBOL

3.1.3 WG 4 Risks, Opportunities, and Issues

- Further decline in resources. Most of the personnel for the technical work has 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

- Working on a three-year revision of ISO/IEC 1539-1 - Fortran.

3.2.2 WG 5 Deliverables

- 2023-09 ISO/IEC 1539-1 - Fortran

3.2.3 WG 5 Risks, Opportunities, and Issues

- Adapting to COVID-19 has resulted in one meeting being canceled, and a delay of approximately six months in development.

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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

- Formally documented the process for Ada standard revisions. The process is unusual because the document comes from a US government agency on the condition that the standard be available for free.
- Submitted a draft for NWIP and DIS of ISO/IEC 8652, the Ada standard.
- Worked with WG 23 to produce ISO/IEC TR 24772-2:2020 Part 2: Ada, and Part 6: SPARK.
- Worked on Defect Reports on ISO/IEC 8652.

3.3.2 WG 9 Deliverables

- Continue to address Ada Defect Reports.
- Update SPARK Part 6 of ISO/IEC TR 24772.
- Finish Ada Part 2 of ISO/IEC TR 24772.
- Move 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.
- 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

- Made progress in its revision of IS 9899, part of which included incorporating portions of TS 18661 into the C standard.
- Has a study group to investigate incorporating 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.
- Has a study group to investigate adjustments to the C memory object model and help draft TS 6010.
- Has a joint study group with WG 21 to coordinate proposals between the two languages.

3.4.2 WG 14 Deliverables

- 2023-08 Revision of ISO/IEC 9899 - Programming Language C.
- 2023-10 TS 6010 on Pointer Provenance.

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3.4.3 WG 14 Risks, Opportunities, and Issues

- The WG has adapted well to virtual meetings. However, virtual meetings have less time available, so the group now has four virtual meetings per year instead of two physical meetings, putting extra pressure on scheduling.

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 a TR on Definite Clause Grammars (DCGs).

3.5.2 WG 17 Deliverables

- Complete the TR on DCGs.

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.

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

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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

Work is underway on the following:

- Published JTC1.22.14882 – Programming Language C++.
- JTC1.22.23619: C++ Extensions for Reflection - technical work complete, pending publication.

3.6.2 WG 21 Deliverables

- Working on the next revision of JTC1.22.14882 (IS C++) and progressing other projects as noted.

3.6.3 WG 21 Risks, Opportunities, and Issues

- COVID-19 makes meeting planning for such a large group quite difficult.
- 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.

3.7.1 WG 23 Accomplishments

- Worked on the various Parts of TR 24772, 3rd edition.

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.

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3.8.1 WG 24 Accomplishments

- The 20 Parts of the 23360 series are now in the publication process.

3.8.2 WG 24 Deliverables

- Shepherd the 23360 Parts through publication.

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.