TECHNICAL SPECIFICATION

ISO/IEC TS 19570

Second edition
2018-11

Programming Languages — Technical Specification for C++ Extensions for Parallelism

Langages de programmation — Spécification technique pour les extensions C++ relatives au parallélisme

Reference number
ISO/IEC TS 19570:2018(E)

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Published in Switzerland

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Foreword [parallel.foreword]

1 ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

2 The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

3 Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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5 For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

6 This document was prepared by Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 22, *Programming languages, their environments and system software interfaces.*

7 This second edition cancels and replaces the first edition (ISO/IEC 19570:2015) which has been technically revised.

8 The main changes compared to the previous edition are as follows:

(8.1) — Eliminate previously standardized functionality.

(8.2) — Introduce task block.

(8.3) — Introduce vector and wavefront policies.

(8.4) — Introduce a template library for parallel for loops.

(8.5) — Introduce data-parallel vector types.

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Programming Languages — Technical Specification for C++ Extensions for Parallelism

1 Scope [parallel.scope]

1 This document describes requirements for implementations of an interface that computer programs written in the C++ programming language can use to invoke algorithms with parallel execution. The algorithms described by this document are realizable across a broad class of computer architectures.

2 There is a possibility of a subset of the functionality described by this document being standardized in a future version of C++, but it is not currently part of any C++ standard. There is a possibility of some of the functionality in this document never being standardized, or of it being standardized in a substantially changed form.

3 The goal of this document is to build widespread existing practice for parallelism in the C++ programming language. It gives advice on extensions to those vendors who wish to provide them.

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2 Normative references [parallel.references]

1 The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

(1.1) — ISO/IEC 14882:2017, *Programming languages — C++*

2 ISO/IEC 14882:2017 is herein called the C++ Standard. References to clauses within the C++ Standard are written as "C++17 §20". The library described in ISO/IEC 14882:2017 clauses 20-33 is herein called the *C++ Standard Library*. The C++ Standard Library components described in ISO/IEC 14882:2017 clauses 28, 29.8 and 23.10.10 are herein called the *C++ Standard Algorithms Library*.

3 Unless otherwise specified, the whole of the C++ Standard's Library introduction (C++17 §20) is included into this document by reference.

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3 Terms and definitions [parallel.defns]

1 For the purposes of this document, the terms, definitions, and symbols given in ISO/IEC 14882:2017 apply.

2 ISO and IEC maintain terminological databases for use in standardization at the following addresses:

(2.1) — ISO Online browsing platform: available at https://www.iso.org/obp

(2.2) — IEC Electropedia: available at http://www.electropedia.org

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