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

Langages de programmation — Spécification technique pour C ++ Extensions pour la concurrence

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Contents

Foreword

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The committee responsible for this document is ISO/IEC JTC1.

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

1 General [general]

1.1 Namespaces, headers, and modifications to standard classes [general.namespaces]

Since the extensions described in this technical specification are experimental and not part of the C++ standard library, they should not be declared directly within namespace `std`. Unless otherwise specified, all components described in this technical specification either:

— modify an existing interface in the C++ Standard Library in-place,
— are declared in a namespace whose name appends `::experimental::concurrency_v1` to a namespace defined in the C++ Standard Library, such as `std`, or
— are declared in a subnamespace of a namespace described in the previous bullet, whose name is not the same as an existing subnamespace of namespace `std`.

Each header described in this technical specification shall import the contents of `std::experimental::concurrency_v1` into `std::experimental` as if by

```
namespace std {
  namespace experimental {
    inline namespace concurrency_v1 {}
  }
}
```

Unless otherwise specified, references to other entities described in this technical specification are assumed to be qualified with `std::experimental::concurrency_v1::`, and references to entities described in the standard are assumed to be qualified with `std::`.

Extensions that are expected to eventually be added to an existing header `<meow>` are provided inside the `<experimental/meow>` header, which shall include the standard contents of `<meow>` as if by

```
#include <meow>
```

New headers are also provided in the `<experimental/>` directory, but without such an `#include`.

Table 1 — C++ library headers

`<experimental/future>`	`<experimental/barrier>`
`<experimental/latch>`	`<experimental/atomic>`

1.2 Future plans (Informative) [general.plans]

This section describes tentative plans for future versions of this technical specification and plans for moving content into future versions of the C++ Standard.

The C++ committee intends to release a new version of this technical specification approximately every year, containing the library extensions we hope to add to a near-future version of the C++ Standard. Future versions will define their contents in `std::experimental::concurrency_v2`, `std::experimental::concurrency_v3`, etc., with the most recent implemented version inlined into `std::experimental`.

When an extension defined in this or a future version of this technical specification represents enough existing practice, it will be moved into the next version of the C++ Standard by removing the `experimental::concurrency_v`*N* segment of its namespace and by removing the `experimental/` prefix from its header's path.

1.3 Feature-testing recommendations (Informative) [general.feature.test]

1 For the sake of improved portability between partial implementations of various C++ standards, WG21 (the ISO technical committee for the C++ programming language) recommends that implementers and programmers follow the guidelines in this section concerning feature-test macros. [*Note:* WG21's SD-6 makes similar recommendations for the C++ Standard itself. — *end note*]

2 Implementers who provide a new standard feature should define a macro with the recommended name, in the same circumstances under which the feature is available (for example, taking into account relevant command-line options), to indicate the presence of support for that feature. Implementers should define that macro with the value specified in the most recent version of this technical specification that they have implemented. The recommended macro name is "`__cpp_lib_experimental_`" followed by the string in the "Macro Name Suffix" column.

3 Programmers who wish to determine whether a feature is available in an implementation should base that determination on the presence of the header (determined with `__has_include(<header/name>)`) and the state of the macro with the recommended name. (The absence of a tested feature may result in a program with decreased functionality, or the relevant functionality may be provided in a different way. A program that strictly depends on support for a feature can just try to use the feature unconditionally; presumably, on an implementation lacking necessary support, translation will fail.)

Table 2 — Significant features in this technical specification

Doc. No.	Title	Primary Section	Macro Name Suffix	Value	Header
N4399	Improvements to std::future<T> and Related APIs	2	`future_continuations`	201505	`<experimental/future>`
N4204	C++ Latches and Barriers	3	`latch`	201505	`<experimental/latch>`
N4204	C++ Latches and Barriers	3	`barrier`	201505	`<experimental/barrier>`
N4260	Atomic Smart Pointers	4	`atomic_smart_pointers`	201505	`<experimental/atomic>`