C++ Club Meeting Notes

Gleb Dolgich

2018-06-07

Cpp.chat Episode #29: “We’ve Dropped The ‘M’ Word”

In this episode we discuss Herb Sutter’s new proposal, p0709, “Zero-overhead deterministic exceptions”, a.k.a. “Static Exceptions” - and a couple of supporting proposals from Niall Douglas (p1028 and p1029).

- YouTube
- iTunes
- Overcast

The Incredible Shrinking Standard - Alisdair Meredith [ACCU 2018]

- Video

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Static Functions

- Can’t be used with templates in C++98 (internal linkage)
  - C compatibility feature, deprecated in initial C++98 standard in favour of unnamed namespaces
  - Un-deprecated in C++11 (all such functions must work with templates)
- Modules: TBD

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Incrementing `bool`

- `bool++` deprecated in original C++98
- `++bool` deprecated in C++03
- Added to C in C99
- Both removed in C++17

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Incrementing `bool`

Was

```cpp
void test(bool before, bool after) {
    ++after;
    if (after and before++) {...}
}
```

Now

```cpp
void test(bool before, bool after) {
    after = true;
    if (after and std::exchange(before, true)) {...}
}
```

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Decrementing `bool`?

- Added to C99
- Not in C++
- Toggles the value

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`export`

- In original C++ Standard
- The only implementation shipped with C++03
- Many surprises due to 2-phase name lookup
- Removed from C++11 without deprecation
- Keyword reserved for future use

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`auto`

- C++98: a local variable in a function
- Removed from C++11

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`register`

- A hint to compiler
- No use other than C compatibility
- Modern compilers ignore it
- Deprecated in C++11
- Removed from C++17
- Keyword reserved for future use

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Trigraphs

- ??! –> #
- Translated by preprocessor ==> expanded in literals and other surprising places
- Attempted to deprecate in C++11, but national bodies objected
- Removed in C++17

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Digraphs

- Alternative keywords, like `and` and `or`
- Fully supported

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Exception specification

- Feature of C++98
- Deprecated in favour of `noexcept` in C++11
- Removed in C++17 apart from `throw()`
- Removing `throw()` from C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Implicit copy operations

- C++98 always declared copy ctor and copy assignment operator for a class (unless it had awkward bases/members)
- Members are not declared in C++11 if a move ctor/assignment operator is declared
- C++11 deprecates implicit declaration of the 2nd copy operation if just one is declared, or a dtor is declared
- C++20: no changes

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`char*` for string literals

- C++98 allows this
- Plain `char*` binding was permitted for C compatibility, but deprecated in C++98
- Removed in C++11

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Narrowing conversions

- C++11: Use uniform initialization
  - Narrowing conversions are ill-formed
- Can break aggregate initialization in legacy code

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

PODs

- What is it? Opinions differ
- Removed in C++20
- Removed the term from core language and deprecated `is_pod` trait

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`gets()`

- No safe usage
- Deprecated in C99, removed in C11
- Removed from C++14

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Ref counted strings

- C++98: `basic_string` supported CoW idiom ** Can be surprising, like calling `begin()` invalidates iterators
- CoW is a performance hazard in concurrent code ==> removed in C++11
- Enabled SSO instead

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`auto_ptr`

- Added in C++98
- Deprecated in C++11 in favour of `unique_ptr`
- Removed in C++17

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`random_shuffle`

- Uses poor-quality C library random function
- Deprecated in C++14 (specify a random generator, or use `shuffle`)
- Removed in C++17

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Adaptable functions

- `bind1st`, `bind2nd`, `mem_fun_ref` etc.
- Rely on protocol of nested typedefs
- Superseded by `std::bind`, so deprecated in C++11
- Removed in C++17

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Vacuous C++ headers

- `<ccomplex>`, `<ciso646>`, `<cstdalign>`, `<cstdbool>`, `<ctgmath>`
- Nothing but compatibility macros in C headers
- To be removed in C++20
- Last contention: `<version>`
- Detect with `__has_include(<header>)`

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`strstreams`

- Older form of string streams (more performant, but harder to use)
- No templates, only supports `char`
- Deprecated in C++98
- No replacement yet

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`std::iterator`

- A base class to provide typedefs for iterators
- Problems with 2-phase lookup not finding typedefs in dependent base class (typical usage)
- Library removed explicit dependency on this in C++11
- Deprecated in C++17

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Temporary buffers

- `get_temporary_buffer`: nobody used it
- No RAII support
- Deprecated in C++17
- To be removed in C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`raw_storage_iterator`

- Constructs elements when assigned (useful with `copy` and `transform`)
- No safe usage if ctor throws
- Deprecated in C++17
- To be removed in C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Deducible members of `std::allocator`

- Allocators should always be accessed via traits since C++11
- Deprecated in C++17
- To be removed in C++20
- Un-deprecate `size_type` and `difference_type` in C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`allocator<void>`

- Mostly empty specialization, no `allocate` member
- Less needed when usage is via `allocator_traits`
- Explicit instantiation will fail due to `allocate`/`deallocate`
- Deprecated in C++17
- To be removed in C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`is_literal`

- Useless unless you know which ctors are `constexpr`
- Deprecated in C++17
- To be removed in C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`result_of`

- Introduced in Library TR1
- Standardised in C++11 as a simple `decltype`
- Could not support some use cases due to ‘cute’ syntax
- Deprecated in C++17, use `invoke_result` instead
- To be removed in C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`uncaught_exception`

- To detect an exception in-flight
- Underspecified (such as when exception is in another thread, or a `try`/`catch` that doesn't escape dtor)
- Deprecated in C++17, use `uncaught_exceptions`
- To be removed in C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Atomic API for `shared_ptr`

- Free function API to use `shared_ptr` atomically without synchronisation
- Easily misused (can't dereference, all operations must happen via this API)
- Deprecated in C++20 in favour of `atomic<shared_ptr>`

`shared_ptr::unique`

- Unreliable with multiple threads
- Ignored `weak_ptr` in other threads (can become locked)
- Deprecated in C++17
- To be removed in C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`basic_string::reserve()`

- Prior to C++20 allows string to shrink
- C++11 removes shrinking permission (for consistency with other containers)
- Calling `reserve()` becomes a no-op unique to `basic_string` – use `clear()` or `shrink_to_fit()`
- Signature without parameters deprecated in C++20

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Namespace `relops`

- Provides default implementations for comparison operators, assuming `operator==` and `operator<` are defined for a type
- No tag class to derive from ==> can’t be hooked with ADL
- Requires `using namespace relops;` to activate which is not good in a header
- Deprecated in C++20 in favour of the spaceship operator

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`<codecvt>`

- Added for Unicode support in C++11
- Underspecified and hard to use
- Deprecated in C++17

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

`wstring_convert`

- Widens/narrows strings using streams interface
- Underspecified and awkward to use
- Deprecated in C++17 without replacement

The Incredible Shrinking Standard - Alisdair Meredith (cont.)

Standard subsets

- C++98 -> C++14
- C++11 -> Latest

East const/Const west: Constant bikeshedding

- Post
- Reddit thread

Igor’s C++ Grimoire

- Link
- Reddit thread

CppInsights

- Link
- Source

Facebook Infer

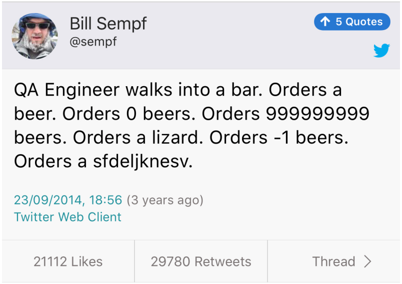
A static analyzer for Java, C, C++, and Objective-C

- Website
- Code

CLion starts 2018.2 EAP

- Post

Twitter


Bill Sempf
@sempf

5 Quotes

QA Engineer walks into a bar. Orders a beer. Orders 0 beers. Orders 999999999 beers. Orders a lizard. Orders -1 beers. Orders a sfdeljknesv.

23/09/2014, 18:56 (3 years ago)
Twitter Web Client

21112 Likes | 29780 Retweets | Thread