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Date: 2024-02-15

Authors: Michael Wong

Project: Programming Language C++, SG14 Games Dev/Low Latency/Financial Trading/Banking/Simulation/Embedded

Reply to: Michael Wong <michael@codeplay.com>

SG14: Low Latency/Games/Embedded/Financial Trading virtual Meeting Minutes 2023/12/13-2024/2/14

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Minutes for 2023/12/13 SG14 Conference Call

On Wed, Dec 13, 2023 at 1:25 AM Michael Wong <fraggamuffin_at_[hidden]> wrote:

> Topic: SG14 Monthly This meeting is focused on Finance but we can continue with
> the Games paper that
> was started in January, depending on what other papers or topics are of
> interest.

>

>

>

> Hi,

>

> Michael Wong is inviting you to a scheduled Zoom meeting.

>

> Topic: SG14 monthly

- > Time: 2nd Wednesdays 02:00 PM Eastern Time (US and Canada)
- > Every month on the Second Wed,
- >
- > Join from PC, Mac, Linux, iOS or Android:
- >
- > <https://iso.zoom.us/j/93151864365?pwd=aDhOcDNWd2NWdTJuT1loeXpKbTcydz09>
- > Password: 789626
- >
- > Or iPhone one-tap :
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- > or 877 853 5247 (Toll Free)
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- > Or Skype for Business (Lync):
- > <https://iso.zoom.us/skype/93151864365>
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- > Agenda:
- >
- > 1. Opening and introduction
- >
- > ISO Code of Conduct

> <

>

>

<https://isotc.iso.org/livelink/livelink?func=ll&objId=20882226&objAction=Open&nexturl=%2Flivelink%2Flivelink%3Ffunc%3DII%26objId%3D20158641%26objAction%3Dbrowse%26viewType%3D1>

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> ISO patent policy.

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> 1.1 Roll call of participants

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> Guy Davidson, Andre Kostur, Bryan St. Amour, Jake Fevold, Lauri Vasama,

> Rene Rivera, Robin Rowe, Henry Miller, Michael Wong, Matthew Butler, Edward

> Catmur, Paul Bendixen, Ka Ming Chan

>

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> 1.2 Adopt agenda

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> 1.3 Approve minutes from previous meeting, and approve publishing

> previously approved minutes to ISOCPP.org

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> 1.4 Action items from previous meetings

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> 2. Main issues (125 min)

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> 2.1 General logistics

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> CPPCON planning

> C++23 and C++26 status

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> *Mar 8, 2023 02:00 PM ET: Embedded

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- > 2.2 Paper reviews
- > Discussion on Embedded:
- > Review latest mailings:
- > P2532 Removing exception_ptr from the receivers concept
- > Based on the last meeting and the discussions here.
- > P2544 C++ Exceptions are becoming more and more problematic
- > We might want to chime in here.
- > /Paul
- > P. S. P2327 de-deprecating volatile received a "consensus" straw poll.
- >
- >
- > Discussion on Low Latency/Finance topics
- > REview topics relevant to fintech
- >
- low latency: hazard pointers , RCU , Patrice games paper:
<https://www.open-std.org/jtc1/sc22/wg21/docs/papers/2023/p2966r1.pdf>
<https://etlcpp.com/>
flatmap, Zach Laine C++23

ring buffer: revival P0059

-executors Dietmar, P2762 Dietmar Kühl - Sender/Receiver Interface for Networking , Ben Deane to come to talk about Intel's embedded.

-coroutine: library coroutine/generator is in C++23

-security?

-networking? Networking TS based on boost::asio rebased to sender receiver

by P2762 SG4: Sender/Receiver Interface For Networking (open-std.org)

<<https://www.open-std.org/jtc1/sc22/wg21/docs/papers/2023/p2762r2.pdf>>

GPU and acceleration:

AI SG19

DFP Finance needs a decimal type with 64-bit integer with a fixed point decimal.

> <http://www.open-std.org/jtc1/sc22/wg21/docs/papers/2022/p1839r4.pdf>

>

> Patrice's paper on games.

>

> P2300

> Swift

>

>

>

> Discussion about Games topics:

- >
- > P2388R1 - Minimum Contract Support: either Ignore or Check_and_abort
- > <<http://www.open-std.org/jtc1/sc22/wg21/docs/papers/2021/p2388r1.html>>
- >
- > Patrice's WIP on Games issues.
- >
- > Finance topics from July 14, 2021.
- >
- > <https://lists.isocpp.org/sg14/2021/06/0636.php>
- >
- > <https://lists.isocpp.org/sg14/2021/07/0642.php>
- >
- > 2.2.1 any other proposal for reviews?
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- > Deterministic Exception for Embedded by James Renwick
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- >
- > https://www.pure.ed.ac.uk/ws/portalfiles/portal/78829292/low_cost_deterministic_C_exceptions_for_embedded_systems.pdf
- >
- > Freestanding?
- >
- > REview and update this master list of interested papers

- > SG14/SG19 features/issues/defects:
- >
- >

>
https://docs.google.com/spreadsheets/d/1JnUJBO72QVURttkKr7gn0_WjP--P0vAne8JBfzbRiy0/edit#gid=0

>

> 2.3 Domain-specific discussions

>

> 2.3.1 SIG chairs

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> - Embedded Programming chairs: Ben Craig, Wouter van Ooijen and Odin

> Holmes, John McFarlane

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> - Financial/Trading chairs: Staffan Tjernström

> Carl Cooke, Neal Horlock,

> - Games chairs: Rene Riviera, Guy Davidson and Paul Hampson, Patrice Roy

>

> - Linear Algebra chairs: Bob Steagall, Mark Hoemmen, Guy Davidson

>

> 2.4 Other Papers and proposals

>

> 2.5 Future F2F meetings:

>

> 2.6 future C++ Standard meetings:

> <https://isocpp.org/std/meetings-and-participation/upcoming-meetings>

>

> -

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> 3. Any other business

- > Reflector
- > <https://lists.isocpp.org/mailman/listinfo.cgi/sg14>
- > As well as look through papers marked "SG14" in recent standards committee
- > paper mailings:
- > <http://open-std.org/jtc1/sc22/wg21/docs/papers/2015/>
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> with the Games paper that

> was started in January, but we also have several other proposals lined up.

> Thank you all for the suggestions and happy holidays.

>

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Jake Favold, Nathan Owen, Patrice Roy, Paul Bendixen. Phil Ratzloft, Rene
Rivera, Robin Rowe, Vikram, John McFarlane, Michael Wong, andrew lumsdaine,
Michael caisse,

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> upcoming conferences:

EMbo++ in Bokum March

ACCU April

C++Now open for paper, after ACCU

CPPNorth: mostly C++ but also multiple languages

> 2.2 Paper reviews

>

> Here is the latest draft of D1709r5 Graph Library for potential review in

> this week's SG14 meeting on Wednesday.

> Enclosed.

>

Phil Ratzloff

Graph Library in the name needed?

supporting bipartite, multipartite graphs

graph, adjacency list, edge list interface for some algorithms

can use existing functionality to transform something into descriptor types

use existing std containers to define a graph

customization points used to get targetid

Not hypergraphs, parallel version of the algorithm, incoming edges (are outgoing edges of the transpose matrix, and only a very few algo needs both) on vertex, not want to limit it in the future

Patrice: Title 1.5: the «with» is misspelled

Isn't «DistanceValue» a strange name for a type (or type constraint)? Maybe it's just me...

why void fns with output arguments? because we dont want the algorithm to allocate so calling code is aware of the expected arguments

Ribin: why not return Boole? Just a design decision why not write exceptions in the throw? We would have to pick a particular type

Patrice asks about freestanding concerns and suggest removing it so as not to be slowed down

Breet mentions throws and exceptions causing problems for low-latency

breaking it up into 4 papers, gloassary, terms and definitions,

FAQ?

highlights?

SG6 review?

>

> Patrice's Games paper review D2966

>

> Arthur's suggestions:

> (1) I put in the Slack channel

> <<https://cpplang.slack.com/archives/C3TK2M6HH/p1703947057425609>> a while

> ago Clang PR #76596 <<https://github.com/llvm/llvm-project/pull/76596>>,

> from one Max Winkler, apparently in game dev. I don't think the PR stands
> much chance of getting merged into Clang; but it might still be of interest
> to SG14 folks. The issue description is very long and somewhat detailed,
> and then there's more discussion/debate in the comments
> <<https://github.com/llvm/llvm-project/pull/76596#issuecomment-1872601156>>.
> (I'd actually be interested in talking to Max, but he doesn't publish his
> email address on GitHub and I guess that might be on purpose.)
>
> (2) LEWG will be seeing my P3055 "Relax wording to permit relocation
> optimizations in the STL"
> <<https://quuxplusone.github.io/draft/d3055-relocation.html>> in a telecon
> on February 20th. (Related blog post.
> <<https://quuxplusone.github.io/blog/2024/01/02/bsl-vector-erase/>>) Might
> be interesting to folks who do EASTL-style containers. I'd be interested in
> early feedback and/or telecon attendance.
>
>
> Discussion on Embedded:
> Paul's suggestions
> The next meeting would then be Embedded and I would be interested in
> knowing if people think a module std.freestanding is worth pursuing.
> In that context I'd like to get some feedback perhaps already for the
> upcoming meeting, if people have started using modules, and if so if it has
> brought the promised expectations or if you are holding back if you see any
> relevance in modules.
>

For freestanding

Brtt's networking TS on Low latency.

- >
- > Review latest mailings:
- > P2532 Removing exception_ptr from the receivers concept
- > Based on the last meeting and the discussions here.
- > P2544 C++ Exceptions are becoming more and more problematic
- > We might want to chime in here.
- > /Paul
- > P. S. P2327 de-deprecating volatile received a "consensus" straw poll.
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> Freestanding?

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> SG14/SG19 features/issues/defects:

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> As well as look through papers marked "SG14" in recent standards committee

> paper mailings:

> <http://open-std.org/jtc1/sc22/wg21/docs/papers/2015/>

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Thanks John for forwarding it.

On Wed, Feb 14, 2024 at 1:51 PM John McFarlane via SG14 <

sg14_at_[hidden]> wrote:

> ----- Forwarded message -----

> From: Michael Wong via SG19 <sg19_at_[hidden]>

> Date: Tue, 13 Feb 2024 at 20:43

> Subject: [SG19] SG14 Feb 14 Monthly call

> To: <sg19_at_[hidden]>

> Cc: Michael Wong <fraggamuffin_at_[hidden]>

>

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> 2.2 Paper reviews

> Embedded:

> * P3132 Accept attributes with user-defined prefixes

>

RTTI enhancement, from QT remarks: if we do this, can we do this without using the unreal, not use and just fix clunky macros

> * P3134 Attribute `[[asserts_rvo]]`

>

Arthur working on a patch NRVO attribute on a return statement;

```
[[clang::nrvo]] return x; // guarantee NRVO here
```


Paul Bendixen:

Paul's suggestions

The next meeting would then be Embedded and I would be interested in knowing if people think a module `std.freestanding` is worth pursuing.

In that context I'd like to get some feedback perhaps already for the upcoming meeting, if people have started using modules, and if so if it has brought the promised expectations or if you are holding back if you see any relevance in modules.

might ask Odin

can I write `import std`, will that give me freestanding? Yes been thinking about it, if on a FS implementation, yes `import std` will

but if you are on multi-platform mix with hosted systems, with bare metal, should get a compile error even if on a hosted tool chain, (this is the dream). Alistair is also interested in a `std` FS module by adding an deprecated attribute that would be hosted attribute. this warns me whenever I use hosted things

FS roadmap:

<https://www.open-std.org/jtc1/sc22/wg21/docs/papers/2020/p2268r0.html>

3 papers: utilities, iterators,

optional operator `new` and feature test macro is all in working draft for 26

P2338 is the working draft now

catchup paper on `inout ptr`, `std span` and `mdspan`

Laurie is working on P2889

Paul has requested to work on `assert`

because codebases may not work with `ssert`, so need modification

I recently noted that `<exception>` is mandated for freestanding by

`<stdexcept>` is not. However `<stdexcept>` would be nice (actual use of language exceptions or not aside) as it basically contains vocab types

that are commonly used in libraries like libfmt.?

because std::string is not appropriate at runtime with FS

new concern is reflection P2996 is all complete time, has stuff defined in terms of std::vector (which is not in freestanding) due to heap alloc and exceptions)

Need help with some testing with consteval, constexpr

support for containers? in_place vectors has a lot of stuff supporting FS, otherwise, array, the other containers all have allocator concept, which has no way of signalling failure, can't be null as that would break the world; at runtime, containers need a lot more work or get P0709, or similar deterministic exceptions, use your own allocator, not std allocator

custom allocator would have to be stack and not heap, or even static global array

Why not use PM allocator? PMR mostly work except failure when it throws an exception; using a runtime switchable mechanism is fine

future discussion on allocation in embedded space ? yes its very domain specific , may be we can only do hooks, we can't say specific technique, even class based on new/delete can go a long way, default one if you have exception on, which is kind of a hook
regarding modules, we are using clang 16, module support might get better later; its compile time heavy

one thing that might still be missing from FS: FS with senders? Seems Ok?
If u ignore exec facility like GPU, then it explicitly not do memory

allocation, just template magic to build call graph at compile time.

BD has an impl on sender and receiver for embedded (not FS), so use atomics, arrays, concurrency model is on interrupts, sync wait is never what you

always need detach because u are going to complete when interrupting returns, and doing start detached out allocation is more challenging; so u need to have all embedded allocation techniques that we talked about - static allocators, stack, nothing from heap

<https://github.com/intel/cpp-baremetal-senders-and-receivers>

agree sync wait is difficult to work with, now what about the spec? what goes in there? will it have //FS? No not in the first bit, will need it to be added to the roadmap, Eric N may be doing it

Stefano Fiorentino is interested to help, please send to ben Craig

what is the status of P2855 change in this one? still using tag_invoke, member functions are great if you deducing this to make that work, else u are delaing with value categories the old way

status paper:

https://docs.google.com/spreadsheets/d/1JnUJBO72QVURttkKr7gn0_WjP--P0vAne8JBfzbRiy0/edit#gid=0

Deterministic Exception for Embedded by James Renwick

>

>
https://www.pure.ed.ac.uk/ws/portalfiles/portal/78829292/low_cost_deterministic_C_exceptions_for_embedded_systems.pdf

>

> Freestanding Updates

>

> Games paper review

>

> Arthur's suggestions:

> (1) I put in the Slack channel

> <<https://cpplang.slack.com/archives/C3TK2M6HH/p1703947057425609>> a while

> ago Clang PR #76596 <<https://github.com/llvm/llvm-project/pull/76596>> ,

> from

> one Max Winkler, apparently in game dev. I don't think the PR stands much

> chance of getting merged into Clang; but it might still be of interest to

> SG14 folks. The issue description is very long and somewhat detailed, and

> then there's more discussion/debate in the comments

> <<https://github.com/llvm/llvm-project/pull/76596#issuecomment-1872601156>> .

> (I'd actually be interested in talking to Max, but he doesn't publish his

> email address on GitHub and I guess that might be on purpose.)

>

> (2) LEWG will be seeing my P3055 "Relax wording to permit relocation

> optimizations in the STL"

> <<https://quuxplusone.github.io/draft/d3055-relocation.html>> in a telecon

> on

> February 20th. (Related blog post.

> <<https://quuxplusone.github.io/blog/2024/01/02/bsl-vector-erase/>>) Might

> be interesting to folks who do EASTL-style containers. I'd be interested in

> early feedback and/or telecon attendance.

>

>

> Discussion on Embedded:

> Paul's suggestions

> The next meeting would then be Embedded and I would be interested in

> knowing if people think a module `std.freestanding` is worth pursuing.

> In that context I'd like to get some feedback perhaps already for the

> upcoming meeting, if people have started using modules, and if so if it has

> brought the promised expectations or if you are holding back if you see any

> relevance in modules.

>

> Review latest mailings:

> P2532 Removing `exception_ptr` from the receivers concept

> Based on the last meeting and the discussions here.

> P2544 C++ Exceptions are becoming more and more problematic

> We might want to chime in here.

> /Paul

> P. S. P2327 de-deprecating `volatile` received a "consensus" straw poll.

>

>

> Discussion on Low Latency/Finance topics

>

> <http://www.open-std.org/jtc1/sc22/wg21/docs/papers/2022/p1839r4.pdf>

>

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>

> Discussion about Games topics:

>

> P2388R1 - Minimum Contract Support: either `Ignore` or `Check_and_abort`

> <<http://www.open-std.org/jtc1/sc22/wg21/docs/papers/2021/p2388r1.html>>

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- > 2.2.1 any other proposal for reviews?
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- >
- >
- > SG14/SG19 features/issues/defects:
- >
- >
- >
https://docs.google.com/spreadsheets/d/1JnUJBO72QVURttkKr7gn0_WjP--P0vAne8JBfzbRiy0/edit#gid=0
- >
- > 2.3 Domain-specific discussions
- >
- > 2.3.1 SIG chairs
- >
- > - Embedded Programming chairs: Ben Craig, Wouter van Ooijen and Odin
- > Holmes, John McFarlane
- >
- > - Financial/Trading chairs: Robin Rowe, Staffan Tjernström
- > Carl Cooke, Neal Horlock,
- > - Games chairs: Rene Riviera, Guy Davidson and Paul Hampson, Patrice Roy
- >
- > - Linear Algebra chairs: Bob Steagall, Mark Hoemmen, Guy Davidson
- >
- > 2.4 Other Papers and proposals
- >

- > 2.5 Future F2F meetings:
 - >
- > 2.6 future C++ Standard meetings:
 - > <https://isocpp.org/std/meetings-and-participation/upcoming-meetings>
 - >
 - > -
 - >
- > 3. Any other business
 - > Reflector
 - > <https://lists.isocpp.org/mailman/listinfo.cgi/sg14>
 - > As well as look through papers marked "SG14" in recent standards committee
 - > paper mailings:
 - > <http://open-std.org/jtc1/sc22/wg21/docs/papers/2015/>
 - > <http://open-std.org/jtc1/sc22/wg21/docs/papers/2016/>
 - >
 - > Code and proposal Staging area
 - > <https://github.com/WG21-SG14/SG14>
- > 4. Review
 - >
 - > 4.1 Review and approve resolutions and issues [e.g., changes to SG's
 - > working draft]
 - >
 - > 4.2 Review action items (5 min)
 - >
- > 5. Closing process
 - >
 - > 5.1 Establish next agenda
 - >
 - > 5.2 Future meeting
 - >

>

> * Jan 10, 2024 02:00 PM ET: Games DONE

> * Feb 14, 2024 02:00 PM ET: Embedded

> * Mar 13, 2024 02:00 PM ET: Cancelled due to Tokyo 3-18-23

> * Apr 10, 2024 02:00 PM ET: Finance

> * May 8, 2024 02:00 PM ET: Games

> * June 12, 2024 02:00 PM ET: Embedded; St.louis 6-24-29

> * July 10, 2024 02:00 PM ET: Finance

> * Aug 14, 2024 02:00 PM ET: Games

> * Sep 11, 2024 02:00 PM ET: CPPCON Sept 15-20 so cancelled

> * Oct 9, 2024 02:00 PM ET: Embedded

> * Nov 13, 2024 02:00 PM ET: Cancelled Wroclaw F2F

> * Dec 11, 2024 02:00 PM ET: Finance