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Date: 2023-10-15

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 Dev/Embedded/Financial Trading/Banking/Simulation virtual Meeting Minutes to 2023/09/12

### Contents

Minutes for 2023/07/11 SG14 Conference Call.....	1
<b>Minutes for 2023/09/12 SG14 Conference Call.....</b>	<b>14</b>

### Minutes for 2023/07/11 SG14 Conference Call

On Tue, Jul 11, 2023 at 11:34 PM Michael Wong <fraggamuffin\_at\_[hidden]> wrote:

- > Topic: SG14 Low Latency Monthly This meeting is focused on Finance/Low
- > Latency though we can continue with the Games paper that
- > was started in January, depending on what other papers or topics are of
- > interest.
- >
- > I am also looking for a finance Subgroup chair. Thank you.
- >
- > 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 :
- > US: +12532158782,,93151864365# or +13017158592,,93151864365#
- > Or Telephone:
- > Dial(for higher quality, dial a number based on your current location):
- > US: +1 253 215 8782 or +1 301 715 8592 or +1 312 626 6799 or +1
- > 346 248 7799 or +1 408 638 0968 or +1 646 876 9923 or +1 669 900 6833
- > or 877 853 5247 (Toll Free)
- > Meeting ID: 931 5186 4365
- > Password: 789626
- > International numbers available: <https://iso.zoom.us/u/abRrVivZoD>
- >
- > Or Skype for Business (Lync):
- > <https://iso.zoom.us/skype/93151864365>
- >
- > Agenda:
- >
- > 1. Opening and introduction

- >
- > ISO Code of Conduct
- > <
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- >
- > <https://isotc.iso.org/livelink/livelink?func=ll&objId=20882226&objAction=Open&nexturl=%2Flivelink%2Flivelink%3Ffunc%3Dll%26objId%3D20158641%26objAction%3Dbrowse%26viewType%3D1>
- > \*>\*
- >
- > ISO patent policy.
- >
- >
- > [https://isotc.iso.org/livelink/livelink/fetch/2000/2122/3770791/Common\\_Policy.htm?no deid=6344764&vernum=-2](https://isotc.iso.org/livelink/livelink/fetch/2000/2122/3770791/Common_Policy.htm?no deid=6344764&vernum=-2)
- >
- > IEC Code of Conduct:
- >
- > <https://www.iec.ch/basecamp/iec-code-conduct-technical-work>
- >
- > WG21 Code of Conduct:
- >
- >
- > <https://isocpp.org/std/standing-documents/sd-4-wg21-practices-and-procedures>
- >
- > 1.1 Roll call of participants
- >

> Guy Davidson, John McFarlane, Patrice Roy

>

Arhtur O'Dwyer, Jake Fevold, Matthew Butler, Rene Morell, Ronen Friedman,  
Michael Wong, Andrew Drakeford

Jens Maurer, Brett Searles, Matthew Bentley

> 1.2 Adopt agenda

>

> 1.3 Approve minutes from previous meeting, and approve publishing

> previously approved minutes to ISO CPP.org

>

> 1.4 Action items from previous meetings

>

> 2. Main issues (125 min)

>

> 2.1 General logistics

>

> Varna F2F

> C++23 and C++26 status

> cppcon sg14? maybe

>

> Future meeting plans

>

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

> \*Apr 12, 2023 02:00 PM ET: Cancelled

> \* May 10, 2023 02:00 PM ET: Cancelled

> \* June 14, 2023 02:00 PM ET: Cancelled

> \* July 12, 2023 02:00 PM ET: Finance

> \* Aug 9, 2023 02:00 PM ET: Games

> \* Sep 12, 2023 02:00 PM ET: Embedded

> \* Oct 1: CPPCON

> \* Oct 10, 2023 02:00 PM ET: Finance

> \*Nov 8, 2023 02:00 PM ET: Kona F2F (Cancelled)

> \* Dec 12, 2023 02:00 PM ET: Games

>

> 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

>

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

>

> Patrice's paper on games.

>

> Arthur O has 2 papers for flatmap and flatset is going to R1

omnibus paper, first 6 sections went to LWG directly

<https://quuxplusone.github.io/draft/d2767-flat-omnibus.html>

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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>>

>

> Patrice's WIP on Games issues.

>

No content in this paper, just a feasibility study as to which feature we

want to pursue. This will break into many smaller actual papers

This paper is attached to this thread.

EASTL to address allocation alignment issues of original STL

today, dont rewrite vector and change semantics,

Need flatmap/set/hive/ring buffer

anything that allocates without explicit action is frowned upon, because it affects framework, more about latency, PS and PC sorting algorithms, random number algo varies and lacks determinism

allocation determinism is how long, and is latency

random number determinism is same number from same seed; RNG engines are supposed to be deterministic in the standard.

(RNG determinism is mentioned in p1932.)

Distributions not so much.

requirements of games dev

speaking of "third-party STLs": There's a guy spending this summer to add P1144 trivial relocation to HPX Stellar!

Latency rather than predictability

Performance = how long it takes to get a set amount of work done (in practice)

Latency = the variability in terms of how long it takes to get the work done

In my view

P0406 Intrusive Containers link:

<https://www.open-std.org/jtc1/sc22/wg21/docs/papers/2016/p0406r1.html>

RF:Ceph (my project, in the Storage realm) uses intrusive containers extensively

a multi-index container based on intrusive c is just being added to my part of the code

AO: an (intrusive or std) list is a sequence container, whereas hive (as

currently proposed) is not — there's no way to insert into an arbitrary position in a hive, like you can into a list.

My variant of hive now supports `emplace_back` and `emplace_front`, because they're always cheap; but you physically can't support `emplace(pos, args...)`

Matthew Bentley talks about his paper PLF orderase

<https://pflib.org/reorderase.htm>

swap and pop behaviour

move and pop based on static and inplace vector

benchmarked it and got really fast single erasure, also fast for ranged

erasure

anyone interested in collaborating on this paper no throw movable and nothrow copyable can just move/copy the back; great for deque and vectors (order matters)

what if order doesn't matter? Not necessary e.g. simd, 16 elements would just move from the back and preserve contagiousness and not suffer cost of copying everything back

There's been a previous SG14 proposal for `unstable_remove` and `unstable_remove_if`.

<https://github.com/Quuxplusone/SG14#efficient-algorithms>

asking for helpers on this paper.

When you `std::unstable_erase(myDeque, 42)`, should the implementation swap-and-pop-front, or swap-and-pop-back? Depends on the surrounding workload.? does back by default



6 going forward

1 not forward

>

>

> 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?

>

> Deterministic Exception for Embedded by James Renwick

>

>

[https://www.pure.ed.ac.uk/ws/portalfiles/portal/78829292/low\\_cost\\_deterministic\\_C\\_e\\_xceptions\\_for\\_embedded\\_systems.pdf](https://www.pure.ed.ac.uk/ws/portalfiles/portal/78829292/low_cost_deterministic_C_e_xceptions_for_embedded_systems.pdf)

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> Freestanding?

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> SG14/SG19 features/issues/defects:

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>

>

[https://docs.google.com/spreadsheets/d/1JnUJBO72QVURttkKr7gn0\\_WjP--P0vAne8JBfzbRiy0/edit#gid=0](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: Carl Cooke, Neal Horlock,
- > - Games chairs: Rene Riviera, Guy Davidson and Paul Hampson, Patrice Roy
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- > - 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

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> 5.1 Establish next agenda

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> 5.2 Future meeting

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> \* Dec 12, 2023 02:00 PM ET: Games



## Minutes for 2023/09/12 SG14 Conference Call

On Tue, Sep 12, 2023 at 1:59 PM Michael Wong <fraggamuffin\_at\_[hidden]> wrote:

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

>

> We will also be announcing a new finance Subgroup chair. Thank you.

>

> Hi,

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

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> Topic: SG14 monthly

> Time: 2nd Wednesdays 02:00 PM Eastern Time (US and Canada)

> Every month on the Second Wed,

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> Join from PC, Mac, Linux, iOS or Android:

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> <https://iso.zoom.us/j/93151864365?pwd=aDhOcDNWd2NWdTJuT1loeXpKbTcydz09>

> Password: 789626

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> Or iPhone one-tap :

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> 346 248 7799 or +1 408 638 0968 or +1 646 876 9923 or +1 669 900 6833

> or 877 853 5247 (Toll Free)

> Meeting ID: 931 5186 4365

> Password: 789626

> International numbers available: <https://iso.zoom.us/j/93151864365>

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> ISO Code of Conduct

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> \*>\*

>

> ISO patent policy.

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> IEC Code of Conduct:

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> <https://www.iec.ch/basecamp/iec-code-conduct-technical-work>

>

> WG21 Code of Conduct:

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>

> <https://isocpp.org/std/standing-documents/sd-4-wg21-practices-and-procedures>

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> 1.1 Roll call of participants,

>

Brett, Jake Fevold, Jacob L , Jens, Patrice, Rene Riviera, Robin, Michael

>

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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

>

> 2. Main issues (125 min)

>

> 2.1 General logistics

>



> CPPCON planning

>

Call for paper

Patrice's Games paper P2966R0

Finance SG chair Robin Rowe, Boost Inciits

> C++23 and C++26 status

>

> Future and past meeting plans

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> Discussion on %S format string expectations:

<https://www.open-std.org/jtc1/sc22/wg21/docs/papers/2023/p2945r0.html>

How many implementations interpret %S showing floating point/fractional seconds

Does SG14 members want to form an opinion on this, and if you care please send to Howard Hinnant

No question this is breaking backwards compatibility

Could also have casted the seconds to show only integer seconds

Specifically this C++20/23 code:

```
#include <chrono>
#include <format>
#include <iostream>

int
main()
{
    using namespace std;
    using namespace chrono;

    auto tp = sys_days{August/30/2023} + 13h + 17min + 50s + 62ms;
    cout << format("{:%F %H:%M:%S}", tp) << "\n";
}
```

Outputs:

```
2023-08-30 13:17:50.062
```

And the LEWG voted to change the output to:

2023-08-30 13:17:50

(dropping the millisecond precision information in the time point).

> 2.2 Paper reviews

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> Review latest mailings:

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

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

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> Discussion on Low Latency/Finance topics

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

>

> Patrice's paper on games. P2966R0

>

Discussed the new P paper and will review in detail at CPPCON 23

Brett also have a few papers that he might expose at CPPCON.

>

> P2300

> Swift

>

>

>

> Discussion about Games topics:

>

> P2388R1 - Minimum Contract Support: either Ignore or Check\_and\_abort

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> Holmes, John McFarlane

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