# Minutes (February 2014)

WG21 Meeting No. 57

10-15 February 2014 – Issaquah, Washington, USA

## 1    Opening activities

Clark Nelson calls the meeting to order on Monday 10 February 2014 at 9:06 a.m. PST (17:06 UTC).

### 1.1    Opening comments, welcome from host

### 1.2    Introductions

Everyone in the room introduces themselves.

### 1.3    Meeting guidelines (Patent and Anti-Trust)

Nelson directs group to the following websites without further comment:

- http://www.incits.org/standards-information/legal-info
- http://www.incits.org/dotAsset/63b6e457-53b9-4933-9835-7c74e77ca2fd.pdf
- http://www.iso.org/iso/codes_of_conduct.pdf

### 1.4    Membership, voting rights, and procedures for the meeting

Nelson explains attendance and voting procedure.

### 1.5    Agenda review and approval

```
Motion: to accept agenda in N3799.

    Unanimous consent.
```

### 1.6    Approval of the minutes of the previous meeting

```
Motion: to accept minutes from previous meeting (N3768 and N3769).

    Unanimous consent.
```

### 1.7    Editor's report, approval of draft

Sutter introduces and explains working drafts being tracked by isocpp.org/std/status.

```
Motion: to accept N3797 as the working draft for Programming Language
C++.
Moved by: Brown
Seconded by: Clow
```

```
    Unanimous consent.
```

Lavavej asks if there is any difference between N3790 and the later N3803. Dawes explains that only the footings and headers. There are no technical differences.

```
Motion: to accept N3790 as the working draft for File Systems TS.
Moved by: Orr
Seconded by: Carruth

    Unanimous consent.
```

Hedquist asks what it means to adopt these as the working draft if they are not at PDTS. Nelson explains that this is the internal document that will be voted out eventually. The working draft is the status quo.

```
Motion: to accept N3848 as the working draft for Library Fundamentals TS.
Moved by: Yasskin
Seconded by: Meredith

    Unanimous consent.
```

```
Motion: to accept N3820 as the working draft for Arrays TS.
Moved by: Carruth
Seconded by: Clow

    Unanimous consent.
```

Meredith asks if we have adopted technical features for either Parallelism or Concepts Lite at a Friday or Saturday full committee vote. Sutter explains that SG1 has voted to approve that. SG8 is the same. Sutter notes that the other three working drafts have been approved by a full committee vote, while Parallelism and Concepts Lite have not.

Maurer says that Concepts Lite has numerous core wording changes. Do we expect Core to have a look at that before it becomes a working draft? Maurer does not want to vote on those now, as they have not passed through Core yet. Sutter says this week that we will discuss what process we want to follow. Sutter says that Parallelism does not have any core extensions.

Nelson observes we do not have consensus to bring motions to approve working draft of either Parallelism or Concepts Lite.

## Editors report:
Du Toit reports N3798 is latest editors report. He thanks Miller, Meredith, and Boehm for their help. He makes a special thanks to Smith and Wakely for editorial fixes.

Du Toit regrets to inform the committee this is his last C++ meeting for foreseeable future. He will see it through C++14 then step down as project editor. There is a round of applause for Du Toit appreciating his contribution.

## 1.8 Liaison reports (including WG21 study groups)

### SC22 report:

Sutter reports we have four new work items and a PDTS.

### SC22/WG14 (C) report:

Plum invites questions about CPLEX. Nelson is working on producing something they can adopt as a draft. Stroustrup asks for explanation of what CPLEX is. Nelson explains that this is a Study Group WG14 started a year ago for C Parallel Language Extensions that covers Cilk and OpenMP.

Nelson asks what WG21 adoption of Floating Point output will be. Crowl says that the plan is to let WG14 do what it will and bring it in afterwards.

Sutter asks what WG14 is working on now. The understanding is that there will be a standard revision once a decade and the work will be on non-normative standards. Is that correct? Nelson says that he does not follow Floating Point work closely. There is currently a plan to produce a five part TS. WG14 is focusing on CPLEX and Floating Point as TS.

Stroustrup expresses concern that the result of CPLEX will force an incompatibility with C++. Carruth notes that Boehm has already updated SG1 wiki page with a discussion of what is going on with CPLEX. Halpern notes that Nelson is the chair and about half of the committee is in attendance here.

Sutter suggests a show of hands to see how many folks would be interested in attending the CPLEX presentation. A dozen or so hands are counted. Sutter asks Boehm if he wants an evening session. Boehm says that most of the hands raised are normal SG1 attendees so it will just be announced on the wiki.

## 1.9 WG and SG progress reports and work plans for the week

### Core working group (CWG):

Miller reports for CWG. Will be concerned with making sure there are resolutions for all NB comments for CD. There are only about 4 that are awaiting drafting. Will also be working at new issues and drafting. About 100 new issues. Situation normal, but prioritizing issues with associated NB comment.

### Library working group (LWG):

Packed schedule this week: addressing a number of projects, addressing issues for CD. There is only one. There is one NB comment to address all open issues. Currently there are about 200 open issues. Will make progress on that, but unlikely to get it to zero. Plan is to start assigning priorities to issues. Goal is not to address. There are 17 papers to review coming from fundamentals TS and File Systems TS.

Sutter asks both LWG and CWG if we are in good shape to vote out a DIS for C++14 at the end of the week. Both Miller and Meredith answer yes. Sutter has been soliciting review for the current draft as a DIS to hopefully skip the last ballot. With the existing working draft there is strong sense that it would. At this level of consensus, anything being voted in at the end of the week should have unanimity to improve consensus of the working draft.

## Evolution working group (EWG):

Stroustrup reports that they will look at Concepts Lite draft to make sure it is ready for Friday. Will then start looking at new issues and papers targeted for C++17. Will start by making a priority order.

Voutilainen says that EWG will also be looking at what will be going into Array TS. Stroustrup says yes. Yasskin asks for EWG to put together a draft schedule. Stroustrup says this will be prepared after prioritization.

Josuttis asks if anything will impact C++14. Stroustrup says the only thing could be move capture for initializer lists.

Sutter reminds everyone that if a NB comment is being addressed that someone from the NB who submitted the comment should be in the room during discussion.

## Library Evolution working group (LEWG):

Yasskin reports that LEWG will not be focusing on C++14. Focusing on papers that would make it into V1 of Fundamentals and then split group to focus on wording. At the end of the week will discuss papers submitted from Study Groups and then new papers. Schedule is on the wiki.

## Study group 1 – Concurrency (SG1):

Boehm reports. Top priority is to finish up C++14 issues. Only paper is to rename shared_mutex to shared_time_mutex. Next priority is to get drafts for existing projects.

Sommerlad asks if it makes sense to adopt an empty working draft. Sutter says that is not what is done for the standard and does not make sense. There would not be a useful technical discussion based on an empty document.

## Study group 2 – Modules (SG2):

Carruth reports that there is active discussion on different modules implementations to come to common ground. Next work is to get a paper submitted to study group. Sutter asks if there are any plans to meet in person or via telecon. Carruth is not aware of any plans.

## Study group 3 – File System (SG3):

Dawes reports. When a ballot closes only 20 days before a meeting there is not enough time to turn comments into issues list. He requests some change to adjust scheduling to give more time between PDTS and meetings. Hedquist was very helpful in producing summary document that Dawes was able to use.

Plauger asks if there is a document that lists changes that has been made. Dawes says there is a red line document prepared with intention of producing record of response.

After removing editorial issues there were 31 NB issues. Adding independently reported issues there were 54 technical issues. While revising wording Krügler and Dawes found several duplicates so the number of issues is in the forties. Will be focusing on addressing those this week.

## Study group 4 – Networking (SG4):

Kloepper reports there is an update to the URI paper to discuss and will be discussing ship vehicles in LEWG.

Sutter adds that there was a vote in Chicago to turn N3783 into a TS working draft. That did not happen. While there is a paper in the mailing with the title of TS working draft, it is not the working draft. We will clarify this week what the plan is and who the editor is.

### Study group 5 – Transactional Memory (SG5):

Wong reports there was good feedback from the meeting in Chicago. Will present revised paper at Evolution. Plan to produce a paper that can be voted on at the end of the week as a working draft for a transactional memory TS.

Sutter would like to take a show of hands of those who would like to see update of TM work: about 20. He suggests an evening session, perhaps Thursday, as a venue to present this.

Meredith asks if proposed document will have library wording or just core wording. Wong says it will have both.

### Study group 6 – Numerics (SG6):

Crowl reports there are a number of papers to look at. Will take a whole day to go through papers. Nothing here affects C++14.

### Study group 7 – Reflection (SG7):

Carruth reports there are two papers to look at (N3815 and N3883).

### Study group 8 – Concepts (SG8):

Stroustrup reports no separate meeting, but only EWG meeting. Sutter asks if there are expectations for a CWG review. Stroustrup says yes.

### Study group 9 – Ranges (SG9):

Clow reports no papers and no meeting. Lavavej reports a ranged for paper in EWG that the range people may care about. Dawes asks if work is stalled. Clow says his work is stalled and he has not seen work others are doing. Yasskin says that he is unsure of where the papers are going which may be stalling SG9 consideration of papers.

### Study group 10 – Feature Test (SG10):

Nelson says there have been no changes since Chicago. The study group will meet briefly this week to talk about future direction. Miller asks if there are any plans to resolve stub in document to create C++11 feature test macros. Sutter highlights that SG10 is first group to have a deliverable (SD-6).

### Study group 11 – Databases (SG11):

Sutter says that Seymour will not be able to serve as chair. As such will disband SG11 and will be picked up by LEWG. He believes there is a paper coming for Rapperswil.

### Study group 12 – Undefined and Unspecified Behavior (SG12):

Sutter is not aware of any papers on the issue. Meredith says there are two papers with UD in preprocessor.

### Study group 13 – Graphics (SG13):

Sutter reports there is an early proposal to get feedback on. Will meet Tuesday after lunch.

## 1.10   New business requiring actions by the committee

Nelson asks if there is any new business. No response.

# 2   Organize Working Groups and Study Groups, establish working procedures

Nelson takes a show of hands for who will be attending which groups to make room assignments.

# 3   WG and SG sessions

Monday 10 February 2014 until 17:30

# 4   WG and SG sessions continue

Tuesday 11 February 2014 8:30 – 17:30

# 5   WG and SG sessions continue

Wednesday 12 February 2014 8:30 – 17:30

# 6   WG and SG sessions continue

Thursday 13 February 2014 8:30 – 17:30

# 7   WG and SG sessions continue

Friday 14 February 2014 8:30 – 12:00

# 8   General session

Friday 14 February 2014 13:30 – 17:30

## 8.1   WG and SG status and progress reports

"Good afternoon Steve." Clamage introduces the purpose of the discussion this afternoon.

### Core working group (CWG):

Miller presents CWG report. Most of the issues had wording ready coming in form Chicago. There are remaining issues to be addressed after C++14 (CA29/1774, FI 15/1776, FI 4/1670).

There are 68 issues in ready status after drafting at this meeting. The decision was made to keep to usual procedure instead of moving these fixes into C++14 to avoid destabilizing the current draft.

STL notes that in 1762 the example of _E is given as correct, but that is reserved for library implementations. Miller says he will withdraw the resolution from the ballot. Smith says this does not introduce and identifier and is not reserved. STL withdraws his complaint. Miller withdraws his withdraw of the resolution. Voutilainen says that the example is incomplete. Miller withdraws his former withdraw of the withdraw.

Sutter clarifies that the Swiss NB is ok with withdrawing this fix. Sommerlad is concerned. Sutter proposes leaving the current resolution in the motion and adding an additional issue to add a comment

in the example. Maurer says he will do that. Finally in response, Miller withdraws the withdraw of the withdraw for the withdraw and the resolution to issue 1762 remains a part of CWG issue 1.

Kloepper asks for a count of voting members. Clamage asks for a show of hands and counts 23. Others count 22. Clamage asks 22 or 23, Clark do you have an opinion? Nelson says there are around 26 PL22.16 members in attendance.

CWG motion 1 passes with unanimous consent.

CWG motion 2 passes with unanimous consent.

CWG motion 3 passes with unanimous consent.

CWG motion 4 passes with unanimous consent.

CWG motion 5 passes with unanimous consent.

CWG motion 6 passes with unanimous consent.

Maurer points out the title of the TS is incorrect for motion 7. Sutter says he will check and make sure it is correct for the formal vote tomorrow.

CWG motion 7 passes with unanimous consent.

## Evolution working group (EWG):
Stroustrup give EWG report. Processed many issues and they discussed many papers.

## Library working group (LWG):
Meredith gives LWG report.

Sommerlad asks if the numbering will be the same even if there are drops? Clamage says yes.

Boehm says there are two issues missing from motion 4: 2104, 2186. Meredith asks Boehm to add an additional concurrency motion to move these resolutions.

Wakely says he would prefer a vote as to if a TS can modify std:: or if it includes the changes by copying elements into a namespace of std::experimental::.

Yasskin says we hope to have a feature complete fundamentals TS today. A vote against papers that modify existing classes effectively moves the feature to Fundamentals 2.

Orr asks if code can detect if TS has been adopted. There is intent to put an informative section in the Fundamentals TS with suggested feature test macros.

van Winkel asks if existing code and use of std:: will remain correct when using a TS that modifies the contents of std::. Yasskin says there will likely be some vendor supported mechanism to opt-in to TS features.

Hedquist says that a TS is an extension of the standard not a revision. Sutter clarifies that anything stated in a TS has no impact on the IS 14482.

LWG motion 1 passes with unanimous consent.

LWG motion 2 passes with unanimous consent.

LWG motion 3 passes with unanimous consent.

LWG motion 4 passes with unanimous consent.

LWG motion 5 passes with unanimous consent.

Yasskin notes that N3387 written by Michael Park is an exemplary paper fully exploring all aspects of the issue. It should be modeled by others crafting and submitting papers.

LWG motion 6 passes with unanimous consent.

Wong, who abstained, notes that there is a .. syntax introduced that needs to be checked against old mainframe systems.

```
Straw poll: LWG motion 7

         yes    no     abstain
PL 22.16  unanimous consent
WG21      6      0      1
```

LWG motion 7 passes.

LWG motion 8 passes with unanimous consent.

LWG motion 9 passes with unanimous consent.

Yasskin notes that this is most likely to change ABI also changes to std:: could be separated into another paper. Meredith says that some could.

```
Straw poll: LWG motion 10

         yes    no     abstain
PL 22.16  18     0      6
WG21      5      0      2
```

LWG motion 10 passes.

LWG motion 11 passes with unanimous consent.

LWG motion 12 passes with unanimous consent.

LWG motion 13 passes with unanimous consent.

```
Straw poll: LWG motion 14

         yes    no     abstain
PL 22.16  unanimous consent
WG21      6      0      1
```

LWG motion 14 passes.

LWG motion 15 passes with unanimous consent.

LWG motion 16 passes with unanimous consent.

LWG motion 17 passes with unanimous consent.

LWG motion 18 passes with unanimous consent.

LWG motion 19 passes with unanimous consent.

LWG motion 20 passes with unanimous consent.

Sutter notes that the paper will not be adopted until the first day of the next meeting.

Orr asks if there is a time scale for when content will be available for review. Hoberock says it will likely be in post meeting mailing.

LWG motion 21 passes with unanimous consent.

```
Straw poll: LWG motion 22

          yes    no     abstain
PL 22.16  15     0      4
WG21      5      0      2
```

LWG motion 22 passes.

## Library Evolution working group (LEWG):

Yasskin presents LEWG report.

Clamage acknowledged the enormous work that is put in by the working group chairs. The room gives a strong round of applause.

## Study group 1 – Concurrency (SG1):

Boehm presents SG1 report.

Yasskin summarizes Hinnant objection. Don't want to proliferate type names. The not timed version is not significantly better and there is no reason to cause users to pick between two almost identical mutex types.

Someone says on windows using a timed mutex will double the footprint of the lock. Carruth says that space concerns on a mutex is misplaced. That naming concerns and that other platforms to add variants in the future is overriding concern.

Sutter says that working draft coming into this meeting. He is looking for unanimity for any change. Procedure for this, or any issue: if there are strong objection it is dead, if it is close then will take a five way straw poll for status quo and change to see which has greater consensus.

Halpern says that the longer name that is more descriptive and makes more sense. Wakely says that it leaves a gap for the user looking for shared_mutex. Spicer advocates that this change opens the door to make additions later.

```
Straw poll: SG1 motion 1

            yes    no     abstain
PL 22.16   17     0      7
WG21        6     0      1
```

SG1 motion 1 passes.

SG1 motion 2 passes with unanimous consent.

SG1 motion 3 passes with unanimous consent.

SG1 motion 4 passes with unanimous consent.

SG1 motion 5 passes with unanimous consent.

## Study group 2 – Modules (SG2):
Group did not meet.

## Study group 3 – File System (SG3):
Nothing more to report.

## Study group 4 – Networking (SG4):
Kloepper reports group did not meet and only change moving Network Byte Order paper from Networking TS to Fundamentals TS. Meredith asks if SG4 is still on track to produce a networking TS in a timely manner. Kloepper says that depends on if papers are submitted and there is sufficient participation in the telecons.

## Study group 5 – Transactional Memory (SG5):
Wong reports.

SG5 motion 1 passes with unanimous consent.

Sutter directs the room to isocpp.org/std/status. He notes that for future TS creation the initial working draft should be present at the same time that the TS work item is requested.

## Study group 6 – Numerics (SG6):
Crowl presents SG6 report.

## Study group 7 – Reflection (SG7):
Carruth reports.

## Study group 8 – Concepts (SG8):
Nothing further to report.

### Study group 9 – Ranges (SG9):
Clow has nothing further to report.

### Study group 10 – Feature Test (SG10):
Nelson reports that they did not meet this week, but will request agenda time from LEWG and EWG in Rapperswil.

Plum suggests having the TS document have suggestions for feature test macros written into them. Nelson says that is the plan. Yasskin clarifies that Nelson is suggesting putting the feature test macro names in the TS itself

### Study group 12 – Undefined and Unspecified Behavior (SG12):
Dos Reis reports group did not meet.

### Study group 13 – Graphics (SG13):
Sutter reports group met for two hours and group gave good feedback to author of N3888.

### WG21:
Miller asks to have the motion text amended to include mention of an editing committee. Sutter says he will add that wording for tomorrow indicating that the sub-committee chairs as the members of the editing committee.

van Winkel asks how many NBs vote on these ballots. Sutter says it is in the low twenties, but what NBs in the room think is most important, as they are most likely to raise objections. Sutter encourages to NB to let committee know and not wait for a ballot.

WG21 motion 1 passes with unanimous consent.

Sutter thanks Du Toit for his work as project editor. There is a standing round of applause. Sutter indicates Smith has volunteered to take over the editor role going forward. Sutter also thanks Kloepper for his work as secretary as he will be stepping down. There is a round of applause.

## 8.2    Presentation and discussion of proposals. Straw votes taken.

# 9    WG and SG sessions continue

# 10   WG and SG sessions continue
Saturday 15 February 2014 8:30 – 12:00

# 11   Review of the meeting
Saturday 15 February 2014 13:30 – 17:30

Clamage opens the meeting. Sutter points out that Richard Smith will be the new Project Editor, supported by Walter Brown, Dawn Perchik and Jonathan Wakely. Kyle Kloepper will be the Project Editor for the Networking TS. Ville Voutilainen will be the WG21 & PL22.16 Secretary.

Clamage counts the PL22.16 voting members, and finds 20 present. Lavavej points out that Plauger needed to leave early, and Lavavej will vote for Plauger.

```
Summary of motion results:

Core        result
CWG 1       carried
CWG 2       carried
CWG 3       carried
CWG 4       carried
CWG 5       carried
CWG 6       carried
CWG 7       carried

Library
LWG 1       carried
LWG 2       carried
LWG 3       carried
LWG 4       carried
LWG 5       carried
LWG 6       carried
LWG 7       carried
LWG 8       carried
LWG 9       carried
LWG 10      carried
LWG 11      carried
LWG 12      carried
LWG 13      carried
LWG 14      carried
LWG 15      carried
LWG 16      carried
LWG 17      carried
LWG 18      carried
LWG 19      carried
LWG 20      carried
LWG 21      carried
LWG 22      carried

Concurrency
SG1 1       carried
SG1 2       carried
SG1 3       carried
SG1 4       carried
SG1 5       carried

Transactional Memory
SG5 1       carried

WG21
WG21 1      carried
```

## 11.1  WG21 motions

Core motions:

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CWG motion 1: Move we accept as Defect Reports the following issues in "ready" status from N3833 and apply their proposed resolutions to the C++ working paper:
1344 1376 1493 1579 1604 1607 1612 1613 1662 1664 1690 1691 1692 1740 1741 1762 1764 1765 1767 1770 1772 1773 1775
Moved by: Miller
Seconded by: Nelson

|  | yes | no | abstain |
|---|---|---|---|
| PL 22.16 | unanimous consent | | |
| WG21 | unanimous consent | | |

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CWG motion 2: Move we accept as Defect Reports the following issues in "tentatively ready" status from N3833 and apply their proposed resolutions to the C++ working paper:
1598 1611 1629 1658 1660 1666 1687 1689 1693 1707 1716 1732 1737 1738 1739 1746 1747 1769
Moved by: Miller
Seconded by: Orr

|  | yes | no | abstain |
|---|---|---|---|
| PL 22.16 | unanimous consent | | |
| WG21 | unanimous consent | | |

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CWG motion 3: Move we apply the proposed resolutions of the following issues in "ready" status from N3833 to the C++ working paper:
1681 1717 1760
Moved by: Miller
Seconded by: Meredith

|  | yes | no | abstain |
|---|---|---|---|
| PL 22.16 | unanimous consent | | |
| WG21 | unanimous consent | | |

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CWG motion 4: Move we apply the proposed resolutions of the following issues in "tentatively ready" status from N3833 to the C++ working paper:

```
1674 1669 1684
Moved by: Miller
Seconded by: Merrill

        yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
CWG motion 5: Move we apply the proposed resolution of issue 1778 from
N3833 to the C++ working paper.
Moved by: Miller
Seconded by: Hedquist

        yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
CWG motion 6: Move we apply N3914, "Additional Core Language Issue
Resolutions," to the C++ working paper.
Moved by: Miller
Seconded by: Smith

        yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

Yasskin asks whether the name [for CWG7] is correct. Sutter explains that will be handled by SC22.

```
CWG motion 7: Move to direct the project editor for the Concepts Lite
Technical Specification to produce an initial working paper based on
N3929 and incorporating modifications suggested by the review at this
meeting.
Moved by: Miller
Seconded by: van Winkel


        yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

Library motions:

LWG motion 1: Move we apply the resolutions of the following issues in
"Ready" status from N3754 to the C++ Working Paper:
LWG2135 (Unclear requirement for exceptions thrown in
condition_variable::wait())
LWG2141 ( std::hash is vulnerable to collision DoS attack)
LWG2142 ( packaged_task::operator() synchronization too broad?)
LWG2240 (Probable misuse of term "function scope" in [thread.condition])
LWG2252 (Strong guarantee on vector::push_back() still broken with
C++11?)
LWG2257 (Simplify container requirements with the new algorithms)
LWG2268 (Setting a default argument in the declaration of a member
function assign of std::basic_string)
LWG2271 ( regex_traits::lookup_classname specification unclear)
LWG2272 ( quoted should use char_traits::eq for character comparison)
LWG2278 (User-defined literals for Standard Library types)
LWG2280 ( begin / end for arrays should be constexpr and noexcept)
LWG2285 ( make_reverse_iterator)
Moved by: Meredith
Seconded by: Dennett


          yes    no    abstain
PL 22.16  unanimous consent
WG21      unanimous consent


LWG motion 2: **NB comment ES 16**
Move we apply the resolutions of the following issues in document N3930
to the C++ Working Paper:
LWG 2299 Effects of inaccessible key_compare::is_transparent type are
not clear
Moved by: Meredith
Seconded by: Halpern


          yes    no    abstain
PL 22.16  unanimous consent
WG21      unanimous consent


LWG motion 3: Move we apply the resolutions of the following issues in
document N3930 to the C++ Working Paper:
LWG 1450 Contradiction in regex_constants
LWG 2003 String exception inconsistency in erase.
LWG 2112 User-defined classes that cannot be derived from
LWG 2132 std::function ambiguity

LWG 2182 Container::[const_]reference types are misleadingly specified
LWG 2188 Reverse iterator does not fully support targets that overload operator&
LWG 2193 Default constructors for standard library containers are explicit
LWG 2205 Problematic postconditions of regex_match and regex_search
LWG 2213 Return value of std::regex_replace
Moved by: Meredith
Seconded by: Nishanov

|  | yes | no | abstain |
|---|---|---|---|
| PL 22.16 | unanimous consent | | |
| WG21 | unanimous consent | | |

LWG motion 4: Move we apply the resolutions of the following issues in document N3930 to the C++ Working Paper:
LWG 2258 a.erase(q1, q2) unable to directly return q2
LWG 2263 Comparing iterators and allocator pointers with different const-character
LWG 2293 Wrong facet used by num_put::do_put
LWG 2301 Why is std::tie not constexpr?
LWG 2304 Complexity of count in unordered associative containers
LWG 2306 match_results::reference should be value_type&, not const value_type&
LWG 2308 Clarify container destructor requirements w.r.t. std::array
LWG 2313 tuple_size should always derive from integral_constant
LWG 2314 apply() should return decltype(auto) and use decay_t before tuple_size
LWG 2315 weak_ptr should be movable
LWG 2316 weak_ptr::lock() should be atomic
LWG 2317 The type property queries should be UnaryTypeTraits returning size_t
LWG 2320 select_on_container_copy_construction() takes allocators, not containers
LWG 2322 Associative(initializer_list, stuff) constructors are underspecified
LWG 2323 vector::resize(n, t)'s specification should be simplified
LWG 2324 Insert iterator constructors should use addressof()
LWG 2329 regex_match()/regex_search() with match_results should forbid temporary strings
LWG 2330 regex("meow", regex::icase) is technically forbidden but should be permitted

LWG 2332 regex_iterator/regex_token_iterator should forbid temporary regexes
LWG 2339 Wording issue in nth_element

LWG 2341 Inconsistency between basic_ostream::seekp(pos) and basic_ostream::seekp(off, dir)
LWG 2344 quoted()'s interaction with padding is unclear
LWG 2346 integral_constant's member functions should be marked noexcept
LWG 2350 min, max, and minmax should be constexpr
LWG 2356 Stability of erasure in unordered associative containers
LWG 2357 Remaining "Assignable" requirement
LWG 2359 How does regex_constants::nosubs affect basic_regex::mark_count()?
LWG 2360 reverse_iterator::operator*() is unimplementable
Moved by: Meredith
Seconded by: Halpern

|          | yes no abstain       |
|----------|----------------------|
| PL 22.16 | unanimous consent    |
| WG21     | unanimous consent    |

LWG motion 5: **NB comment US 21**
Move we apply to the Working Paper the Proposed Wording from N3924, "Discouraging rand() in C++14"
Moved by: Meredith
Seconded by: Halpern

|          | yes no abstain       |
|----------|----------------------|
| PL 22.16 | unanimous consent    |
| WG21     | unanimous consent    |

LWG motion 6: Move we apply to the Working Paper the Proposed Wording from N3887, "Consistent Metafunction Aliases"
Moved by: Meredith
Seconded by: Halpern

|          | yes no abstain       |
|----------|----------------------|
| PL 22.16 | unanimous consent    |
| WG21     | unanimous consent    |

LWG motion 7: Move we apply the resolutions of the following issues in document N3931 to the Filesystem TS Working Paper:
SG3 2 Tighten specification when there is no reasonable behavior
SG3 3 Filename length needs bullet item
SG3 6 Path depth is underspecified

SG3 7 Unhelpful comment for struct space_info
SG3 8 file_time_type underspecified
SG3 9 Unclear why range-based-for functions return different types
SG3 14 Incorrect postconditions for path copy/move constructor
SG3 15 Missing behavior for characters with no representation
SG3 16 Append behavior underspecified if target is empty
SG3 18 is_absolute() return clause confusing
SG3 19 Consider using quoted manipulators
SG3 21 directory_entry operator== needs clarification
SG3 24 Incorrect effects clause for path copy
SG3 29 Unclear semantics of read_symlink on error
SG3 32 system_complete() example needs clarification
SG3 33 unique_path() is a security vulnerability
SG3 44 enum classes copy_options and perms should be bitmask types
SG3 47 last_write_time() uses ill-formed cast
SG3 50 path::compare(const string& s) wrong argument type
SG3 52 Better to avoid deriving from std::iterator
SG3 55 Clarify Error reporting
Moved by: Meredith
Seconded by: Orr


        yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent


LWG motion 8: Move we apply to the Library Fundamentals TS Working Paper
the Proposed Wording from N3921 string_view library
Moved by: Meredith
Seconded by: Halpern

        yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent


LWG motion 9: Move we apply to the Library Fundamentals TS Working Paper
the Proposed Wording from N3804 any library
Moved by: Meredith
Seconded by: Seymour

        yes    no     abstain

PL 22.16  unanimous consent
WG21      unanimous consent

LWG motion 10: Move we apply to the Library Fundamentals TS Working
Paper the Proposed Wording from N3916, "Polymorphic Memory Resources"
Moved by: Meredith
Seconded by: Halpern

|          | yes | no | abstain |
|----------|-----|----|---------|
| PL 22.16 | 12  | 0  | 7       |
| WG21     | 6   | 0  | 1       |

LWG motion 11: Move we apply to the Library Fundamentals TS Working
Paper the Proposed Wording from N3905 Faster string searching (Boyer-
Moore et al.)
Moved by: Meredith
Seconded by: Orr

|          | yes | no | abstain |
|----------|-----|----|---------|
| PL 22.16 | unanimous consent | | |
| WG21     | unanimous consent | | |

LWG motion 12: Move we apply to the Library Fundamentals TS Working
Paper the Proposed Wording from N3925 A sample proposal (data sampling,
real proposal!)
Moved by: Meredith
Seconded by: van Winkel

|          | yes | no | abstain |
|----------|-----|----|---------|
| PL 22.16 | unanimous consent | | |
| WG21     | unanimous consent | | |

LWG motion 13: Move we apply to the Library Fundamentals TS Working
Paper the Proposed Wording from N3932 Variable Templates For Type Traits
Moved by: Meredith
Seconded by: Halpern

|          | yes | no | abstain |
|----------|-----|----|---------|
| PL 22.16 | unanimous consent | | |
| WG21     | unanimous consent | | |

```
LWG motion 14: Move we apply to the Library Fundamentals TS Working
Paper the Proposed Wording from N3915, "make apply normative"
Moved by: Meredith
Seconded by: Garcia

            yes     no      abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
LWG motion 15: Move we apply to the Library Fundamentals TS Working
Paper the Proposed Wording from N3923 A SFINAE-Friendly
std::iterator_traits
Moved by: Meredith
Seconded by: Halpern

            yes     no      abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
LWG motion 16: Move we apply to the Library Fundamentals TS Working
Paper option 2 of the Proposed Wording from N3843 A SFINAE-Friendly
std::common_type
Moved by: Meredith
Seconded by: Halpern

            yes     no      abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
LWG motion 17: Move we apply to the Library Fundamentals TS Working
Paper the Proposed Wording from N3920 Extending shared_ptr to Support
Arrays
Moved by: Meredith
Seconded by: Halpern

            yes     no      abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
LWG motion 18: Move we apply to the Library Fundamentals TS Working
Paper the Proposed Wording from N3783, "Network Byte Order Conversion."
Moved by: Meredith
Seconded by: Orr


          yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
LWG motion 19: Move we apply to the Library Fundamentals TS Working
Paper the amendments recommended by N3793, "Proposal to add a utility
class to represent optional objects (Revision 5)"
Moved by: Meredith
Seconded by: Halpern


          yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
LWG motion 20: Move we apply to the Library Fundamentals TS Working
Paper the Proposed Wording from N3866, "Invocation type traits (Rev.
2)", but dropping function_call_operator.
Moved by: Meredith
Seconded by: Nishanov


          yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
LWG motion 21: Move to direct the project editor for the Parallelism
Technical Specification to produce an initial working paper based on
N3850.
Moved by: Boehm
Seconded by: Carruth


          yes    no     abstain
PL 22.16  unanimous consent

WG21      unanimous consent
```

Merrill points out that LWG22 also changes ABI.

```
LWG motion 22: Move to direct the project editor for the Concurrency
Technical Specification to produce an initial working paper based on
N3785 and N3857 and incorporating modifications suggested by the reviews
at this meeting.
Moved by: Boehm
Seconded by: Carruth


           yes    no     abstain
PL 22.16  15     0       5
WG21       5     0       2
```

Concurrency motions:

```
SG1 motion 1: Move we apply N3891, "A proposal to rename shared_mutex to
shared_timed_mutex", to the C++14 WP.
Moved by: Boehm
Seconded by: Nishanov


           yes    no     abstain
PL 22.16  unanimous consent
WG21       6     0       1
```

```
SG1 motion 2: Move we apply the resolution of LWG 2288, currently in new
status, to the C++14 WP, taking care to rename shared_mutex as in N3891
(if accepted).
Moved by: Boehm
Seconded by: Carruth


           yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

```
SG1 motion 3: Move we apply N3910, "What can signal handlers do? (CWG
1441)" (US3) into the C++14 WP.
Moved by: Boehm
Seconded by: Carruth


           yes    no     abstain

PL 22.16  unanimous consent
WG21      unanimous consent
```

SG1 motion 4: Move we apply N3927 "Definition of lock-free" (LWG 2075, US5) to the C++14 WP.
Moved by: Boehm
Seconded by: Carruth

```
          yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

SG1 motion 5: Move we apply the resolutions of issues LWG 2104, LWG 2186 (US27), which were intended to be in ready status, but not listed as such, to the C++14 WP.
Moved by: Boehm
Seconded by: Carruth

```
          yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

Transactional Memory motions:

SG5 motion 1: Move to direct the Convener to request a New Work item for a Technical Specification for C++ Transactional Memory based on N3919 as an indication of its content.
Moved by: Wong
Seconded by: Boehm

```
          yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

WG21 motions:

WG21 motion 1: Move to appoint an editing committee composed of Daniel Krügler, Alisdair Meredith, Mike Miller, Bjarne Stroustrup, and Jeffrey Yasskin to approve the correctness of the C++ working paper as modified by the motions approved at this meeting, and to direct the Convener to transmit the approved updated C++ working paper to ITTF for DIS ballot.
Moved by: Hedquist

Seconded by: van Winkel

```
          yes    no     abstain
PL 22.16  unanimous consent
WG21      unanimous consent
```

No issues.

# 12    Plans for the future

## 12.1    Next and following meetings

Sutter explains the upcoming C++ meetings, pointing out that Rapperswil is next, followed by Urbana-Champaign, Lenexa, and Kona. Sutter explains that Lenexa shouldn't be too close to WG14 and ACCU. Someone points out that Kona needs additional sponsors. Sutter says he doesn't yet have a plan for 2016, and invites potential hosts to contact him. He says that it is possible ACCU will be co-located.

Plum says he won't be able to host without co-sponsors and asks whether an alternative location should be considered. Sutter responds that that should be looked at in Rapperswil and expresses confidence that it'll work out.

Halpern asks why WG14 hasn't been back-to-back. Sutter says that's because they haven't been co-located, and says that WG14 will likely co-located. Halpern asks whether Urbana will co-locate, and Seymour said WG14 will be in St. Louis. Halpern points out that cooperation and face-to-face discussions with WG14 is much easier if they co-locate.

Meredith points out that 3 meetings annually works great for pushing out TSes. Meredith asks for a possibility to have a pseudo-meeting for just library work. Sutter says SGs can meet at any time, and he'd be happy to convene a WG21 meeting with a limited agenda. Yasskin says he doesn't have an LEWG position for it, but thinks it would be useful.

Sutter suggests having a discussion about that on the reflectors, and getting back to it in Rapperswil.

Carruth says he has photos of the final vote on the wiki, and people can distribute as they please as long as they don't charge for it.

## 12.2    Mailings

# 13    Adjournment

Sutter announces CppCon 2014, presented by the C++ Foundation. Sutter solicits everyone in the committee to present in the event. Clow said that the registration opens soon, and any questions can be directed to him, and seconds Sutter's solicitation for speakers. Sutter explains that CppCon will practically include and extend GoingNative, and there will be lots of opportunities to speak, as it will be a 5-day event. Sutter says that people interested in helping organize the event are welcomed to contact him, Clow, or John.

Sutter also points out that the C++ FAQs are being collected on isocpp.org.

```
Motion: to adjourn
Moved by: Hedquist
```

```
Seconded by: Orr

    Unanimous consent.
```

Adjourned Saturday 15 February 2014.

## 14  Attendance

### 14.1  PL22.16 members

Principal representative designated with *.

| Organization | Representative | M | T | W | R | F | S |
|---|---|---|---|---|---|---|---|
| AMD | Robin Maffeo* | ✓ | ✓ | ✓ | ✓ | | |
| Argonne National Lab | Hal Finkel | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Bloomberg | John Lakos* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bloomberg | Alisdair Meredith | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Bloomberg | Dietmar Kühl | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Brown | Walter E. Brown | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Dinkumware | P.J. Plauger* | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Dinkumware | Tana Plauger | ✓ | ✓ | ✓ | ✓ | ✓ | |
| DRW Holdings | Thomas Rodgers | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Edison Design Group | Daveed Vandevoorde | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Edison Design Group | Jens Maurer | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Edison Design Group | John H. Spicer* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Edison Design Group | William M. Miller | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Embarcadero Technologies | Dawn Perchik* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| FlightSafety International | Billy Baker* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Gimpel Software | James Widman | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Google | James Dennett | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Google | JC  van Winkel | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Google | Chandler Carruth | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Google | Jeffery Yasskin | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Google | Richard Smith | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Google | Geoffrey Romer | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| GreenWireSoft | Juan Alday* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Hewlett-Packard Development | Hans Boehm | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| IBM | Michael Wong* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| IBM | Maged Michael | | ✓ | ✓ | ✓ | | |
| IBM | Paul E. McKenney | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Indiana University | Larisse Voufo | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| Organization | Name | | | | | | |
|---|---|---|---|---|---|---|---|
| Intel | Clark Nelson* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Intel | Pablo Halpern | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Intel | Robert Geva | | ✓ | ✓ | | | |
| Intel | Justin Gottschlich | | ✓ | ✓ | | | |
| Intel | Tatiana Shpeisman | | ✓ | ✓ | | | |
| KCG Holdings | Robert Douglas* | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Lexmark International | Michael Price* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Lexmark International | Christopher Sammis | ✓ | ✓ | | | | |
| Louisiana State University | Hartmut Kaiser* | ✓ | ✓ | ✓ | | | |
| Louisiana State University | Agustin Berge | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Microsoft | Jonathan Caves* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Microsoft | Herb Sutter | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Microsoft | Artur Laksberg | ✓ | ✓ | ✓ | ✓ | | |
| Microsoft | Stephan T Lavavej | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Microsoft | Gabriel Dos Reis | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Microsoft | Gor Nishanov | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Microsoft | Vinny Romano | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Microsoft | James McNellis | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Microsoft | Mark Hall | | | ✓ | | | |
| NVidia | Olivier Giroux | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| NVidia | Jared Hoberock | ✓ | ✓ | ✓ | ✓ | | |
| Oracle | Stephen D. Clamage | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Oracle | Victor Luchangco | | ✓ | ✓ | ✓ | ✓ | |
| Perennial | Barry Hedquist* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Perennial | Beman G. Dawes | ✓ | ✓ | ✓ | ✓ | | |
| Perennial | Lawrence Crowl | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Plum Hall | Thomas Plum* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Programming Research Group | Christof Meerwald | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Qualcomm | Marshall Clow* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Red Hat | Jason Merrill* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Red Hat | Jonathan Wakely | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Red Hat | Torvald Riegel | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Riverbed | Kyle Kloepper* | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Sandia National Labs | Carter Edwards | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Seymour | Bill Seymour* | ✓ | ✓ | ✓ | | ✓ | ✓ |
| Symantec | Mike Spertus* | ✓ | ✓ | ✓ | | | |
| Texas A&M University | Bjarne Stroustrup* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## 14.2   PL22.16 non-members

| Organization | Representative | M | T | W | R | F | S |
|---|---|---|---|---|---|---|---|
| Bob Taco Industries | Michael McLaughlin | ✓ | ✓ | ✓ | | | |
| CryptoTec | Mikael Kilpelainen | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Datasift | Dinka Ranns | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| HSR | Peter Sommerlad | ✓ | ✓ | ✓ | ✓ | ✓ | |
| LTK Engineering | Alan Talbot | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Reliable Software | Bartosz Milewski | ✓ | ✓ | ✓ | ✓ | | |
| Roundhouse Consulting | Pete Becker | ✓ | ✓ | ✓ | ✓ | ✓ | |
| University Carlos III | J. Daniel Garcia | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| University of Akron | Andrew Sutton | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Vollmann Engineering | Detlef Vollmann | | ✓ | ✓ | ✓ | | |
| Thalmic Labs | Stefanus Du Toit | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | Nicolai Josuttis | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | Ville Voutilainen | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Roger Orr | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Mozilla | Botond Ballo | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Cassio Neri | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Faisal Vali | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Nat Goodspeed | | ✓ | ✓ | ✓ | | |
| | Zhihao Yuan | ✓ | ✓ | ✓ | ✓ | | |
| | Eric Niebler | ✓ | ✓ | ✓ | ✓ | ✓ | |
| | Yuriy Solodkyy | ✓ | | | | | |
| F5 Networks | Michael VanLoon | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Jeff Snyder | | ✓ | ✓ | ✓ | ✓ | ✓ |
| | Xiang Fan | ✓ | | | | | |
| | Josh Petrie | ✓ | | | | | |
| CERT | Aaron Ballman | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Amazon | Victor Bogado | ✓ | ✓ | ✓ | ✓ | | |
| | Marc Singer | ✓ | ✓ | ✓ | | ✓ | |

## 14.3   JTC1/SC22/WG21 technical experts

Heads of delegation designated with *.

| Affiliation | Representative |
|---|---|
| Netherlands | JC van Winkel* |
| Canada | Michael Wong* |
| Canada | Stefanus Du Toit |
| United States | Barry Hedquist* |

| | |
|---|---|
| Germany | Nicolai Josuttis |
| Switzerland | Peter Sommerlad |
| Switzerland | Detlef Vollmann* |
| Spain | J. Daniel Garcia* |
| United Kingdom | Roger Orr* |
| United Kingdom | Jeff Snyder |
| United Kingdom | Cassio Neri |
| Finland | Ville Voutilainen* |
| Finland | Mikael Kilpelainen |