Document number: N3768
Date: 2013-10-16
Reply to: Kyle Kloepper (Kyle.Kloepper@riverbed.com)

Minutes (September 2013)

PL22.16 Meeting No. 61
WG21 Meeting No. 56
23-28 September 2013 – Chicago, Illinois, USA

1 Opening activities

Clamage calls the meeting to order on Monday 23 September 2013 at 9:03 a.m. CST (14:03 UTC).

1.1 Opening comments, welcome from host

Liber welcomes everyone to Chicago and thanks DRW Trading Group for hosting.

1.2 Introductions

Clamage asks everyone in the room to introduce themselves.

1.3 Meeting guidelines (Patent and Anti-Trust)

Clamage directs group to the following websites without further comment:

- http://www.incits.org/pat_slides.pdf
- http://www.incits.org/inatrust.htm

1.4 Membership, voting rights, and procedures for the meeting

Clamage discusses differences between PL22.16 and WG21. Clamage explains WG21 voting. Nelson explains PL22.16 voting.

1.5 Agenda review and approval

```
Motion: to accept agenda in N3704.
Moved by: Marshall Clow
Seconded by: Nevin Liber

    Unanimous consent.
```

1.6 Approval of the minutes of the previous meeting

```
Motion: to accept minutes from previous meeting (N3622).
Moved by: Barry Hedquist
Seconded by: Pablo Halpern

    Unanimous consent.
```

1.7 Editor's report, approval of draft

Du Toit presents the editors report (N3692). He states that he applied changes to the working draft as directed by the committee. Any deviations to proposed wording is noted in the report.

Miller asks if there are any differences between N3690 and N3691. Du Toit replies that only difference is the cover.

```
Motion: to accept Nxxxx as the working draft.
Moved by: Pablo Halpern
Seconded by: Nevin Liber

    Unanimous consent.
```

```
Motion: to accept N3693 as the working draft TS Filesystem.
Moved by: Beman Dawes
Seconded by: Alisdair Meredith

    Unanimous consent.
```

Dawes says to be very careful about precise name including spacing. Project editor can change entire contents, but changing any aspect of name is total disaster.

Sutter says this is what we will be doing regularly at start of meeting. First thing we do is vote to accept current working draft. That is what we will write papers against. Now we have multiple projects.

1.8 Liaison reports (including WG21 study groups)

SC22 report:

Sutter reports that nothing happened that affects us.

We have work item for modules and concepts.

We had CD ballot. That succeeded. Had a record low comment count. Thank you very much for high quality of standard.

There were comments at the Tokyo meeting that parallelism is heating up. There was talk about creating a common parallel group. [groans from room] Sutter says, don't worry, nothing happened.

It was noted that WG14 created CPLEX. Resolution was to invite them to talk at Madrid meeting next year. Second resolution was to encourage groups to talk to each other.

Plum points out that WG14 CPLEX and parallelism SG1 in WG21 are in organizational category of study group. They are open for people to participate in. Several people participate in both groups. Need to be mindful there will be Ada, Cobol, and Fortran folks that may want to join study groups.

Sutter says Steve Michael for Ada and a few other are on CPLEX conference calls.

SC22/WG14 (C) report:

Plum says main liaison work is in Nelsons group.

Nelson says that language extensions for parallelism was created in Delft after WG21 Bristol meeting.

Plum says what was important to SC22 when a specific technology is defined. That tech works better with certain schedulers than others. What you produce as a library may not define schedulers, but it may influence choice. No one has expressed desire to define low-level schedulers standard.

Nelson explains that when WG14 created study group. They were going to come up with syntax to be made into SG that harmonized CILK and OpenMP. People joined study group with all kinds of other things to do. Trying to coral cats. WG14 has not expressed interest in those yet (lambdas, SIMD, closure).

Other:

Clamage asks if there is a database liaison. Seymour says there is no liaison yet.

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

Core working group (CWG):

Focus this week is addressing CD comments. Formally obligated to come up with ROR for ballot comments. But will be coming up CA comments as well. Miller reviewed Deprecated paper. Will be looking at revised wording for paper. Expecting that will be moved for inclusion in C++14. Will be triaging new issues. Run rate for new issues in C++11 has significantly trailed off. 1/3 of new comments address C++14 wording. Primary emphasis will be on resolving NB comments.

Sutter says if comments about tweaking wording affect design of a feature, then EWG and LEWG should be involved. Should be relatively rare at this stage. One example is digit separators; it should go back to EWG.

Miller says digit separators will not be addressed until it is through EWG.

Sutter says that each NB comment must be addressed even if the response is there is no consensus for change. Everything done to C++14 must increase consensus. Not only between countries here, but should not do anything that will surprise people who are not here.

Voutilainen asks how to triage comments that must go through EWG before CWG. Miller says that EWG can send him an issue list they will take. Otherwise CWG will go though list and hand stuff over as they see those issues. Stroustrup says it does not take very long to do issue passing between groups.

Library working group (LWG):

Meredith reports NB comments are primary order of business. Second order of business is some things to push out Filesystem TS.

There may be papers we will not get to this week.

Josuttis says there are issues that address both CWG and LWG. Meredith says he and Miller will coordinate. Miller says there are one or two places where issues are assigned to LWG but there is a small CWG component. There are currently assigned to LWG in Miler's tracking document.

Evolution working group (EWG):

Stroustrup reports goal is to have boring meeting. Thanks to Voutilainen for issues list. Work through issues list from CWG as quickly as possible and throw it back. There are NB comments and great bikeshed issue [digit separators]. There will be some talk of concepts and if that will go into EWG or not.

Josuttis asks if EWG plans to meet whole week. Stroustrup will spend first part of meeting making more plans.

Boehm says there was a discussion of joint SG5 and EWG meeting. Stroustrup says that is a good idea. Wong says they have TS wording and need wider input.

Library Evolution working group (LEWG):

Yasskin reports there are a few NB comments to respond to. Will be talking about TSs. LEWG will decide what will go in Fundamentals vs next standard. Want input from implementers. Then have a few papers. Don't have a full week. Tentatively done on Thursday.

Meredith would appreciate more manpower. Yasskin suspects it would be better to move papers to LEWG and have LWG focus on issues. Sutter suggests moving papers that would not be addressed in LWG to LEWG.

Study group 1 – Concurrency (SG1):

Boehm reports goal is to have direction for each NB comment.

Study group 2 – Modules (SG2):

Gregor reports there are no new papers. Will have very brief meeting to sync up.

Study group 3 – File System (SG3):

Dawes reports. Meredith asks what namespace is TS going into. Dawes says that is an early issue Yasskin will be addressing in LEWG.

Someone asks if this mark end of SG3? Dawes says no, there are valid additions that are asked for, but cut off. We are still in business. Wong says specifically enterprise filesystems.

Study group 4 – Networking (SG4):

Kloepper reports that SG4 will work to finalize the wording for Network Byte Order paper and there is one paper to address. Sutter asks if we want to get to a draft wording at the end of meeting. Kloepper says yes provided that LEWG agrees.

Study group 5 – Transactional Memory (SG5):

Wong reports that N3718 is wording Transactional Memory TS. SG5 is looking to get wider input.

Sutter clarifies they are presenting to EWG. Jens suggests having daytime session. Tana Plauger agrees. Sutter asks how to schedule it. Stroustrup says how about after lunch tomorrow?

Meredith would like to have an evening session. Carruth seems it is strange to dedicate daytime to something is not C++14. Sutter says that informational presentation is usually for evening.

Tana Plauger says that there have been evening session, people need to come and listen to whole plan together. Those interested need to be in meeting. We are trying to get TS voted out. Jens says that it is only a work item request not a full TS.

Wong says it is not education level. It is to get guidance and feedback.

Voutilainen say that evening session is missing as it conflicts with dinner. Evening session attendance is difficult for having to eat.

Carruth clarifies that he is not advocating for evening session, but not to have it on the list at all.

Stroustrup says last two comments ignore 60 hands that want to attend.

Meredith says this is unfortunate timing.

Clamage says that WGs are allowed to set their own priorities. if EWG and SG1 can set a time.

Sutter reminds of high order bit of improving consensus.

Stroustrup will take that for guidance and will discuss what to review sometime in first hour of EWG meeting.

Study group 6 – Numerics (SG6):

Crowl reports 1 or 2 NB issues to address. Paper to address. Need no more than half a day to get through that.

Study group 7 – Reflection (SG7):

Carruth reports one paper to discuss. Scheduled an evening session from Friday at 8:00. Talk about how to get more movement in reflection.

Study group 8 – Concepts (SG8):

Austern reports there is still a plan to produce TS soon. Have evening session to discuss progress of paper on Wednesday.

Study group 9 – Ranges (SG9):

Clow reports no activity in past few months. One paper to discuss. Will have evening session.

Study group 10 – Feature Test (SG10):

Nelson reports N3745 has set of recommendations that will have approval by straw vote. Will be discussed in EWG before that. The reason it is a straw vote is that we are not planning to take recommendations through ISO balloting process.

Study group 11 – Databases (SG11):

No progress made since Bristol. Not planning to meet this week. Sutter says that Wiki will be updated if there is a meeting.

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

Dos Reis reports group created after Bristol. There is one paper and there will be an evening session to discuss.

1.10 New business requiring actions by the committee

Sutter says there had been interested in graphics. He will create a SG unless there is a reason to put it in LEWG. SG13 will be chaired by Sutter and will have its first meeting Saturday Morning. Have something more than BT100 in standard. Some basic 2D graphics. Determine scope and start looking at proposal. Explicitly not attempt to be a portable GUI framework. Would be nonstarter and doomed to fail to standardize a platform in its own right.

Josuttis asks where we are with C++14. Sutter says we are now in ballot resolution. New features were stopped in Bristol.

Austern says if I am in a WG what status should I put it in to get it into C++14. Meredith says we are doing ballot resolution. Will be voting in immediate issues.

Miller says that we will have February meeting, which means they will not need to change procedure. If in Issaquah meeting we come up with resolution that need to go into draft there will be an accelerated procedure.

2 Organize Working Groups and Study Groups, establish working procedures

3 WG and SG sessions

Monday 23 September until 17:30

4 WG and SG sessions continue

Tuesday 24 September 8:30 – 17:30

5 WG and SG sessions continue

Wednesday 25 September 8:30 – 17:30

6 WG and SG sessions continue

Thursday 26 September 8:30 – 17:30

7 WG and SG sessions continue

Friday 27 September 8:30 – 12:00

8 General session

Friday 27 September 13:30 – 17:30

8.1 WG and SG status and progress reports

Core working group (CWG):

Miller presents CWG report.

CWG motion 1 passes with unanimous consent.

CWG motion 2 passes with unanimous consent.

Josuttis asks if there is a library need to do anything in response to CWG motion 3.

Miller replies LWG is recommended but not required to mark deprecated features. It is not normative.

Hinnant asks if it has been implemented. Miller replies there are numerous implementations. PJ Plauger says it has.

CWG motion 3 passes with unanimous consent.

Hinnant asks if CWG motion 4 has this been implemented. Clow says it has. Carruth agrees Smith has implemented this in Clang.

Sutter says ‘ has been proposed before but there is new information.

Hinnant asks is there any library impact? He thinks the answer is no, but wants to check. Clamage says there is no requirement they be used. Carruth says there is no valid C++11 code that this make unvalid. This has no impact on library.

Vandevoorde says we do know of counter examples. Smith says Tangential impact if there is a library that defines raw literal operator. It would have to be parsed yourself.

Clamage asks does it talk about string literals? Smith say it has to do with raw literal operator.

Halpern asks if there is any expectation that stoi() would start parsing the quote an throw it out. Vandevoorde says no.

Stroustrup comments this is surprising as this was unanimous from EWG.

Clow says N3642 has example of this. This code would need to change, but not part of standard, just example.

Josuttis asks is overall intention to provide this kind of literal for inside programming code, or to outer interfaces like functions that converts from string to numeric? Meredith says that is a good question for LEWG. Stroustrup says there are numeric facets that we support for that. Smith says standard parsing functions do not deal with other literals like binary literals. So this is not new distinction.

Meredith asks if we accept this, do we need to buy a new bikeshead?

Carruth says examples of extremely contrived code were known to EWG. Did exhaustive search for such code and they were not found. Sutter says when doing that search in excess of 100M lines of code. Found comments where they were doing this [using single quote] already. String literals parsed into class objects.

Stroustrup says example was contrived that in after he stared at screen for a minute he failed to understand it.

Josuttis asks if it is a reasonable step that we support this format in functions passed to stod() or stoi() in the future. Meredith says excellent question but for LEWG not full committee.

```
straw poll: CWG motion 4

          yes   no    abstain
PL 22.16  20    0     3
WG21      unanimous consent
```

CWG motion 4 passes.

Meredith says we are not going to break any existing programs by adopting CWG motion 5 as worded.

Hinnant says there is a close linkage between this and STL. Must be synced with library changes. This is a much more difficult to implement. Will take 3-5 years to phase in. Will be the last C++14 feature implemented. Nelson asks when will you have implemented second to last C++14 feature. Hinnant replies this will be the only C++14 feature that will take years to field.

Sutter asks is it because it is an ABI breaking change? Howard says ABI breaking is especially scary. This is ABI addition. It does not exist on previous OSs. Clow says it does not exist on 10.8.

Howard likes the feature but looks like good 17 feature.

Smith says there is a technical solution to this: version of this compiler ships with library that provides this. Only issue is when using old linker and new compiler.

Hinnant clarifies that this would be a compiler RT solution? [yes] Still think it is aggressive for 14, but does help.

Gregor: initial list was header only change. Needed new library, but did not need a new back end linking. Smith is correct that we can deploy it faster.

Carruth says implementing this in a compiler is easy. Enabling it for customer requires that the library deployment must be finished.

Clow says when Crowl proposed this to LWG there was a lot of pushback. He wrote a response. Attached to LWG page (sized deletion-1). Not enabled by default but there would have to be work done to turn it on.

```
straw poll: CWG motion 5

          yes   no    abstain
PL 22.16  13    0     9
WG21      unanimous consent
```

CWG motion 5 passes.

Library working group (LWG):

Meredith presents LWG report.

Voutilainen recommends Finish NB comment 16 is rejected. Nelson says that some of these will be looked at in next standard. Meredith asks is there any objection to rejecting this comment? There is no objection.

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.

In regards to LWG motion 6 Yasskin says that LEWG did not say ::rand() was to be deprecated. Meredith says LWG changed the wording.

Sutter says since it has come up, deprecate means exactly and only that we put the world on notice that we may someday remove it from the standard. It is still normatively required. Merely a comment that we might remove it. Good luck to Fortran that has been using deprecated features for decades.

PJ Plauger says operation definition is when you deprecate it is no longer an option for a NB comment when it is taken out. A bit unsure about what can and cannot happen in C library. Merrill says gets() was deprecated in c99 and removed in c11.

Sutter says we own definition of C++ standard. We get to recommend or approve. There is nothing we get to do for C standard. When you create a standard very often you will reference other standards. We include parts normatively by reference. We own C++; the question is how compatible do we want to be with C.

Du Toit says there is wording in standard as to what it is.

Liber asks is this considered an incompatibility with C and will it get annex wording. Sutter says calling something deprecated has zero effect. It cannot introduce incompatibility. Becker say standard wise that's true, but there are people in practice who will not use it.

Sutter says if you want to ship a product that implements standard you must implement it.

Du Toit says it is not an unreasonable request to mark in compatibility section and suggest you do not support this.

Vandevoorde asks why is this needed? Meredith says it give clear guidance to use <random> facility instead of rand(). Brown says there is history pointed out in paper that this has been the plan since Pittsburg meeting.

Nelson asks is this in response to NB comment? Meredith says yes.

Vandevoorde is strongly opposed to this direction. I don't think we should tell people how to program.

Voutilainen ask Sutter if we have a consensus on this. Sutter replies that he does not answer hypothetical consensus.

Spicer says if it is not clear that we have consensus, then we don't have consensus. Sutter replies no, it is up to me to determine consensus. Why we do not have a formula. It maters how strong those objections are. It matters about position of NBs not in the room. Have to get in front of SC22 and say it will create a better DIS. We try to find the option that has the strongest consensus.

```
straw poll: LWG motion 6

          yes   no    abstain
PL 22.16  8     7     7
WG21      4     2     2
```

LWG motion 6 fails with no consensus.

In regards to LWG motion 7 Vandevoorde asks do we have implementation experience. Clow says have implemented, but not deployed in large codebases.

Nelson asks is this in response to NB comment? Clow says wrote in response to NB comment that no longer applies. Was necessary to fix wording of optional.

```
straw poll: LWG motion 7

          yes   no    abstain
PL 22.16  18    0     5
WG21      unanimous consent
```

LWG motion 7 passes.

LWG motion 8 passes with unanimous consent.

```
straw poll: LWG motion 9

          yes   no    abstain
PL 22.16  unanimous consent
WG21      7     1     0
```

Sutter asks Voutilainen reason for no vote. Voutilainen replies that he not agree with reasons for removal. It is ready for C++14.

Meredith asks is that with current working, or with wording from this meeting. Voutilainen says with some of the changes. And believes it is easy to apply towards C++14.

Wong asks for explanation of removal of option facility. Sutter says there are NB comments about readiness. Wong says those would have been addressed in this meeting. Sutter says it all depends on consensus for single change.

Meredith says there was consensus on where optional was going, but not sure it was right.

Yasskin said they found good direction for it to go. There was NB comment to not affect quality of standard. Making these changes would affect quality.

Van Eerd says there were a whole series of cross cutting. The most consent was to throw it into TS.

In regards to LWG motion 10 Maurer expresses displeasure of removing runtime-sized array. Have great implementation experience. Think removing runtime-sized arrays is not necessary part of motion. Meredith says there was no consensus for decoupling.

Van Eerd says this looks like an LEWG and LWG motion. Stroustrup says this was discussed in LWG and then taken to LEWG. Sutter says EWG and LEWG own recommending design and where proposal are going. It is LWG and CWG who own wording. We usually see these from LWG as they are the last who have it.

In this case LWG and LEWG did have a semi-joint session. This exactly one of those cases where multiple straw polls were used to find most consensus. The only other strong consensus was only moving dynarray. Because we talked with NBs were not in room there was opposition to separating the two.

Vandevoorde echos Maurer's disappointment. Shocked really. Not aware of what happened in LEWG. There was strong opposition to removing runtime array bounds in EWG.

Dawes says there was a coupling argument, but there was also argument that it would do harm to uses.

Spicer strongly objects to removal of runtime-sized arrays. dynarray and this does not need to be coupled. Feature already available in many implementation. Would like to keep it in.

Josuttis says we see the problem of having many working groups. Need a way to announce that significant straw votes will be taken.

Stroustrup says looking at wiki for EWG that there are so many comments it is hard to find. Lots of votes where we tried to balance out concerns. Everything but this solution had strong votes.

Dennett says while I would like to have that in the standard. It does not matter as the implementations have them already.

Halpern says in Bristol would like to vote against dynarray and for runtime sized arrays. Almost as a point of honor they would have to move together.

Halpern says originally opposed to removing runtime bounds. Lots of implementation experience for c99 version. There have been strong arguments to have C++ specific semantics for how they behave and decay. Some of these choices could be in conflict with current wording.

Stroustrup says putting both VLAs and dynarrays into a TS is only solution that has consensus. VLAs alone do harm. If that is the only thing they can do for stack memory. That kind of interface is a bug. VLAs by themselves need work. Cannot pass in any way to an algorithm to get it tow work as you cant pass it to begin() and end(). There is a reason we introduced std::array. The reason was so the end count would not be lost.

Meredith hands floor to Sutter.

Sutter says status quo poll is necessary to know if moving will increase consensus.

Wong asks if he should poll constituents.

Garcia says this cannot be a library only library. Sutter agrees, it should be understood that dynarray is a magic library.

Smith says there is an implantation that exists without compiler support, but it may exist with lower level support. Stroustrup says if it is not implemented on the stack then it fails to implement the point of this class.

Meredith says we did this in TR1. Type traits required compiler intrinsics.

Carruth says it can be implemented without compiler support but it is less good. Dennett says we should not get into detailed discussion here.

```
Straw poll: move nothing (status quo)

          ++    +     =     -     --
PL22.16   0     0     1     15    4
WG21      0     0     0     5     3
```

```
Straw poll: move only dynarray to TS

          ++    +     =     -     --
PL22.16   6     4     3     5     3
WG21      1     0     1     4     2
```

```
Straw poll: move both to TS

          ++    +     =     -     --
PL22.16   8     7     4     1     1
WG21      5     3     0     0     0
```

- Meanings for the above columns are usual in WG21 straw polls: ++ strongly in favor, + weakly in favor, = neutral, - weakly against, -- strongly against.

LWG motion 11 passes with unanimous consent.

Evolution working group (EWG):

Stroustrup reports EWG did a lot of work, but no motions. 16 NB comments to deal with. About right. 20 issues dealt with. 6 papers to go through and went through 5.

Library Evolution working group (LEWG):

Yasskin reports for LEWG. He says namespace for TS is std::experimental.

LEWG motion 1 passes with unanimous consent.

LEWG motion 2 passes with unanimous consent.

LEWG motion 3 passes with unanimous consent.

LEWG motion 4 passes with unanimous consent.

Study group 1 – Concurrency (SG1):

Boehm presents SG1 report.

Meredith asks about signal handler paper. Boehm says he is hoping to get it into C++14, but not in this paper.

SG1 motion 1 passes with unanimous consent.

SG1 motion 2 passes with unanimous consent.

Study group 2 – Modules (SG2):

Gregor reports SG2 has not met yet. SG2 will meet at 8:30 tomorrow.

Study group 3 – File System (SG3):

Dawes reports there is a bit of work left with FS. Now it is time to start thinking about TS2.

Study group 4 – Networking (SG4):

Kloepper reports progress made during the week. Sutter clarifies that we expect a PDTS in Issaquah. Kloepper replies that depends on when the Fundamentals TS is shipping. Specifically URI depends on string view.

Study group 5 – Transactional Memory (SG5):

Wong reports progress made this week.

Study group 6 – Numerics (SG6):

Crowl reports there is ongoing work and no paper approved yet. There is new work in WG14 on floating point. Likely end up bringing that in by reference.

Wong asks if there is any direction with decimal floating point in SG6. Crowl responds that the paper came to him in Portland, but the author has not come back yet.

Study group 7 – Reflection (SG7):

Carruth reports SG7 have not yet met yet.

Study group 8 – Concepts (SG8):

Austern reports.

Sutter asks why we are waiting until Issaquah to vote that in as working draft for TS. Austern replies there is still some work left to do.

Study group 9 – Ranges (SG9):

Clow reports.

Study group 10 – Feature Test (SG10):

Nelson reports that they have not met, but N3745 was discussed in EWG. Passed through. There was a plan to have WG21 approve it. He naively assumed that C++14 was feature complete and we would not be adding anything. Jokes on me. In a quandry as to what to do. Plan was to get a straw poll of everyone in room to give it some sort of cachet, but we are going to have to work it over a bit.

Spicer says that feature test macros are in place during development and deploy for C++14. This allows folks to figure out what does and does not exist. Don't think it is a big issue if something is removed.

Spicer says we are looking for endorsement for direction we are going. Presence or absence of features should not be a problem.

Van Eerd says there may almost be a benefit to have now obsoleted macros there.

Sutter observes that there is more work for SG10 to do and it will be a living document. It seems you want an informal document and blessing of the room that we think that is a right idea. It is a standing document of the SG. Not normative.

```
Straw poll: move nothing (status quo)

    ++    +     =     -     --
    lots  lots  1     0     0
```

Study group 11 – Databases (SG11):

Seymour reports SG11 did not meet. Now have an email on isocpp.org.

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

Dos Reis reports SG12 met from 8:40-10:20 yesterday. Try to understand charter. We need to educate user community about what UD is. There is a paper that lists where something is UD or unspecified from Richard Smith.

Study group 13 – Graphics (SG13):

Sutter reports on SG13. Meeting tomorrow at 9:30am tomorrow morning.

8.2 Presentation and discussion of proposals. Straw votes taken.

Straw votes take place with reports in 8.1.

9 WG and SG sessions continue

10 WG and SG sessions continue

Saturday 28 September 8:30 – 12:00

11 Review of the meeting

Saturday 28 September 13:30 – 17:30

```
Summary of motion results:

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

Library
LWG 1     carried
LWG 2     carried
LWG 3     carried
LWG 4     carried
LWG 5     carried
~~LWG 6~~     removed
LWG 7     carried
LWG 8     carried
LWG 9     carried
LWG 10    carried
LWG 11    carried

Library Evolution
LEWG 1    carried
LEWG 2    carried
LEWG 3    carried
LEWG 4    carried

Concurrency
SG1 1     carried
SG1 2     carried
```

11.1 WG21 motions

Core motions:

```
CWG motion 1: Move we accept as Defect Reports all issues in "ready"
status from N3713 except for 1629 and apply their proposed resolutions
to the C++ working paper: 1287 1307 1417 1567 1575 1583 1608 1648
Moved by: William Miller
Seconded by: Marshal Clow

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

CWG motion 2: Move we accept as Defect Reports all issues in "tentatively ready" status from N3713 except for 1611 and apply their proposed resolutions to the C++ working paper: 1424 1460 1508 1509 1514 1551 1562 1569 1570 1576 1587 1592 1593 1595 1601 1618 1649
Moved by: William Miller
Seconded by: Barry Hedquist

	yes	no	abstain
PL 22.16	unanimous consent		
WG21	unanimous consent		

CWG motion 3: Move we apply N3760, "[[deprecated]] attribute," to the C++ working paper.
Moved by: William Miller
Seconded by: Chandler Carruth

	yes	no	abstain
PL 22.16	unanimous consent		
WG21	unanimous consent		

CWG motion 4: Move we apply N3781, "Single-Quotation-Mark as a Digit Separator," to the C++ working paper.
Moved by: William Miller
Seconded by: Bjarne Stroustrup

	yes	no	abstain
PL 22.16	22	0	2
WG21	unanimous consent		

CWG motion 5: Move we apply N3778, "C++ Sized Deallocation," to the C++ working paper.
Moved by: William Miller
Seconded by: Barry Hedquist

	yes	no	abstain
PL 22.16	11	5	7
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:
LWG2141 (common_type trait produces reference types)
LWG2235 (Undefined behavior without proper requirements on basic_string constructors)
LWG2246 (unique_ptr assignment effects w.r.t. deleter)
LWG2247 (Type traits and std::nullptr_t)
Moved by: Alisdair Meredith
Seconded by: Marshal Clow

	yes	no	abstain
PL 22.16	unanimous consent		
WG21	unanimous consent		

LWG motion 2: Move we apply the resolutions of the following issues in "Tentatively Ready" status from N3754 to the C++ Working Paper:
LWG2085 Wrong description of effect 1 of basic_istream::ignore
LWG2087 iostream_category() and noexcept
LWG2143 ios_base::xalloc should be thread-safe
LWG2150 Unclear specification of find_end
LWG2180 Exceptions from std::seed_seq operations
LWG2194 Impossible container requirements for adaptor types
Moved by: Alisdair Meredith
Seconded by: Nevin Liber

	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 N3788 to the C++ Working Paper:
LWG 2013 Do library implementers have the freedom to add constexpr?
LWG 2018 regex_traits::isctype Returns clause is wrong
LWG 2078 Throw specification of async() incomplete
LWG 2097 packaged_task constructors should be constrained
LWG 2100 Timed waiting functions cannot timeout if launch::async policy used
LWG 2120 What should async do if neither 'async' nor 'deferred' is set in policy?
LWG 2159 atomic_flag initialization
LWG 2275 Why is forward_as_tuple not constexpr?
LWG 2284 Inconsistency in allocator_traits::max_size

LWG 2298 is_nothrow_constructible is always false because of create<>
LWG 2300 Redundant sections for map and multimap members should be removed
Moved by: Alisdair Meredith
Seconded by: Marshal Clow

	yes	no	abstain
PL 22.16	unanimous consent		
WG21	unanimous consent		

LWG motion 4: Move we apply the proposed resolutions of the following National Body comments, as described in n3733, to the C++ Working Paper:
GB 7 missing table reference
ES 15 unused table reference
GB 9 remove gets from library
Moved by: Alisdair Meredith
Seconded by: Roger Orr

	yes	no	abstain
PL 22.16	unanimous consent		
WG21	unanimous consent		

LWG motion 5: Move we apply to the Working Paper the Proposed Wording from N3779, "User-defined Literals for std::complex."
Moved by: Alisdair Meredith
Seconded by: Bjarne Stroustrup

	yes	no	abstain
PL 22.16	21	0	2
WG21	unanimous consent		

~~LWG motion 6:~~ Move we apply to the Working Paper the Proposed Wording from N3775, "Deprecating rand() and Friends."
Moved by: Alisdair Meredith
Seconded by:

[motion removed]

LWG motion 7: Move we apply to the Working Paper the Proposed Wording from N3789, "Constexpr Library Additions: functional."
Moved by: Alisdair Meredith
Seconded by: Marshal Clow

	yes	no	abstain
PL 22.16	unanimous consent		
WG21	unanimous consent		

LWG motion 8: Move we direct the Networking TS project editor to produce a Working Paper based on N3783, "Network Byte Order Conversion."
Moved by: Alisdair Meredith
Seconded by: Kyle Kloepper

	yes	no	abstain
PL 22.16	unanimous consent		
WG21	unanimous consent		

LWG motion 9: Move we create a Working Paper for the planned Library Fundamentals TS, remove the edits applied to the C++14 CD by N3672, "A proposal to add a utility class to represent optional objects", and direct the Library Fundamentals TS project editor to apply those words to the Library Fundamentals Working Paper as its initial content.
Moved by: Alisdair Meredith
Seconded by: Jeffery Yasskin

	yes	no	abstain
PL 22.16	18	1	5
WG21	7	1	0

LWG motion 10: Move we create a Working Paper for a planned Array Extensions TS, remove the edits applied to the C++14 CD by the two papers

N3639, "Runtime-sized arrays with automatic storage duration (revision 5)"
N3662, "C++ Dynamic Arrays (dynarray)"

and direct the Array Extensions TS project editor to apply those words to the Array Extensions Working Paper as its initial content.
Moved by: Alisdair Meredith

```
Seconded by: Nevin Liber

          yes   no    abstain
PL 22.16  18    0     6
WG21      unanimous consent
```

```
LWG motion 11: Move we request the Convener to advance the Filesystem TS
Working Paper to SC22 for PDTS Ballot.
Moved by: Alisdair Meredith
Seconded by: Roger Orr

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

Library evolution motions:

```
LEWG motion 1: Move to direct the Convener to request a New Work Item
for a Technical Specification on Library Fundamentals.
Moved by: Jeffrey Yasskin
Seconded by: Marshal Clow

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

```
LEWG motion 2: Move to direct the Convener to request a New Work Item
for a Technical Specification on Array Extensions.
Moved by: Jeffrey Yasskin
Seconded by: Barry Hedquist

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

```
LEWG motion 3: Move to direct the Convener to request a New Work Item
for a Technical Specification on C++ extensions for parallelism.
See N3724 for some indication of content.
Moved by: Jeffrey Yasskin
Seconded by: Pablo Halpern
```

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

```
LEWG motion 4: Move to direct the Convener to request a New Work Item
for a Technical Specification on C++ extensions for concurrency.
See N3731 and N3721 for some indication of content.
Moved by: Jeffrey Yasskin
Seconded by: Hans Boehm

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

Concurrency motions:

```
SG1 motion 1: Move to apply N3786: Prohibiting "out of thin air" results
in C++14, to the C++ working paper.
Moved by: Hans Boehm
Seconded by: Michael Wong

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

```
SG1 motion 2: Move that we apply N3776, Wording for ~future, to the C++
working paper.
Moved by: Hans Boehm
Seconded by: Chandler Carruth

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

Other motions:

11.2 PL22.16 motions

11.3 Review of action items, decisions made, and documents adopted by the committee

11.4 Issues delayed until today

12 Plans for the future

12.1 Next and following meetings

Sutter talks about next and following meetings. Directs people to isocpp.org upcoming meetings.

There is a discussion about meeting duration and voting schedule that ends with a straw poll:

```
Straw poll: should the meeting schedule be changed?

    change      no change
    7           lots
```

Sutter says we are staying with what we have.

12.2 Mailings

Nelson presents upcoming mailing deadlines.

post-meeting: October 11

pre-Issaquah: January 17

13 Adjournment

```
Motion: to adjourn
Moved by: Clark Nelson
Seconded by: Marshal Clow

    Unanimous consent.
```

Adjourned Saturday 28 September at 2:49 p.m. CST (19:49 UTC).

14 Attendance

14.1 PL22.16 members

Principal representative designated with *.

Organization	Representative	M	T	W	R	F	S
Apple	Howard E. Hinnant*	✓	✓	✓	✓	✓	✓
Apple	Doug Gregor	✓	✓	✓	✓	✓	✓

Bloomberg	John Lakos*	✓	✓	✓	✓	✓	
Bloomberg	Alisdair Meredith	✓	✓	✓	✓	✓	✓
Bloomberg	Dietmar Kühl	✓	✓	✓	✓	✓	✓
Cisco Systems	Martin Sebor*	✓	✓	✓	✓	✓	
Dinkumware	P.J. Plauger*	✓	✓	✓	✓	✓	✓
Dinkumware	Tana Plauger	✓	✓			✓	
DRW Holdings	Nevin Liber*	✓	✓	✓	✓	✓	✓
DRW Holdings	Brian Mehaffey	✓					
DRW Holdings	Thomas Rodgers	✓	✓	✓	✓		
DRW	Derek Groothuis	✓					
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*	✓	✓	✓	✓	✓	✓
Gimpel Software	James Widman	✓	✓	✓	✓	✓	✓
Google	James Dennett	✓	✓	✓	✓	✓	✓
Google	Matthew Austern*	✓	✓	✓	✓	✓	✓
Google	Chandler Carruth	✓	✓	✓	✓	✓	✓
Google	Jeffery Yasskin	✓	✓	✓	✓	✓	✓
Google	Richard Smith	✓	✓	✓	✓	✓	✓
Hewlett-Packard Development	Hans Boehm	✓	✓	✓	✓	✓	✓
IBM	Michael Wong*	✓	✓	✓	✓	✓	✓
IBM	Hubert Tong	✓	✓	✓	✓	✓	✓
Indiana University	Larisse Voufo	✓	✓	✓	✓	✓	✓
Intel	Clark Nelson*	✓		✓	✓	✓	✓
Intel	Pablo Halpern	✓	✓	✓	✓	✓	✓
Intel	Robert Geva	✓	✓	✓	✓	✓	
Intel	Arch Robison	✓	✓	✓	✓	✓	✓
Intel	Tatiana Shpeisman	✓	✓	✓	✓	✓	✓
Louisiana State University	Hartmut Kaiser	✓	✓	✓			
Microsoft	Jonathan Caves*	✓	✓	✓	✓	✓	✓
Microsoft	Herb Sutter	✓	✓	✓	✓	✓	✓
Microsoft	Artur Laksberg	✓	✓	✓	✓	✓	
Microsoft	Niklas Gustafsson	✓	✓	✓	✓	✓	✓
Microsoft	Stephan Lavavej	✓	✓	✓	✓	✓	✓
Microsoft	Gabriel Dos Reis	✓	✓	✓	✓	✓	✓
NVidia	Olivier Giroux	✓	✓	✓	✓	✓	✓

NVidia	Jared Hoberock	✓	✓	✓	✓	✓	
NVidia	Michael Garland				✓	✓	✓
Oracle	Paolo Carlini*	✓	✓	✓	✓	✓	✓
Oracle	Stephen D. Clamage	✓	✓	✓	✓	✓	✓
Oracle	Victor Luchangco	✓	✓	✓	✓	✓	
Perennial	Barry Hedquist*	✓				✓	
Perennial	Beman G. Dawes	✓	✓	✓	✓	✓	✓
Plum Hall	Thomas Plum*	✓	✓	✓	✓	✓	
Programming Research Group	Christof Meerwald	✓	✓	✓	✓	✓	✓
Qualcomm	Marshall Clow*	✓	✓	✓	✓	✓	✓
Rebar Systems	Juan Alday*	✓	✓	✓	✓	✓	
Red Hat	Jason Merrill*	✓	✓	✓	✓	✓	✓
Red Hat	Torvald Riegel	✓	✓	✓	✓	✓	✓
Riverbed	Kyle Kloepper*	✓	✓	✓	✓	✓	✓
Riverbed	Bob Kuo	✓	✓				
Seymour	Bill Seymour*	✓	✓		✓	✓	✓
Symantec	Mike Spertus*	✓	✓		✓	✓	✓
Datasift	Dinka Ranns	✓	✓	✓	✓	✓	✓
Texas A&M University	Bjarne Stroustrup*	✓	✓	✓	✓	✓	✓
University of Akron	Andrew Sutton	✓	✓	✓			

14.2 PL22.16 non-members

Organization	Representative	M	T	W	R	F	S
CryptoTec	Mikael Kilpeläinen	✓	✓	✓	✓	✓	✓
Frankfurt Inst. for Adv. Studies	Matthias Kretz	✓	✓	✓	✓	✓	✓
Goldman Sachs	Jeff Snyder	✓	✓	✓	✓	✓	✓
HSR	Peter Sommerlad	✓	✓	✓	✓	✓	✓
BlackBerry	Tony Van Eerd	✓	✓	✓	✓	✓	✓
Roundhouse Consulting	Pete Becker	✓	✓	✓	✓	✓	✓
think-cell Software	Fabio Fracassi	✓	✓	✓	✓	✓	✓
TU Dresden	Peter Gottschling	✓		✓	✓	✓	✓
University Carlos III	J. Daniel Garcia	✓	✓	✓	✓	✓	✓
University of Nice	Jean-Paul Rigault	✓	✓	✓	✓	✓	✓
Vollmann Engineering	Detlef Vollmann	✓	✓	✓	✓	✓	✓
	Nicolai Josuttis	✓	✓	✓	✓	✓	✓
	Ville Voutilainen	✓	✓	✓	✓	✓	✓
	Roger Orr	✓	✓	✓	✓	✓	✓
	Andrew Sandoval		✓	✓			

	Eugene Yakubovich	✓	✓	✓	✓	✓	
	Faisal Vali	✓	✓	✓	✓	✓	
	Gene Panov	✓	✓	✓			
	Lawrence Crowl	✓	✓	✓	✓	✓	✓
WMS Gaming	Michael Bytnar	✓	✓	✓	✓	✓	
	Nat Goodspeed		✓	✓	✓		
Mozilla	Botond Ballo	✓	✓	✓	✓	✓	✓
KCG	Robert Douglas	✓	✓	✓	✓		
3Red	Robert Zeh	✓	✓	✓	✓	✓	
	Walter E. Brown	✓	✓	✓	✓	✓	✓
	Zhihao Yuan	✓	✓	✓	✓	✓	
	Michael Kristofik	✓					
	Ari Levin	✓					
	Nathan Wilson	✓	✓		✓		
Argonne National Lab	Hal Finkel	✓	✓	✓	✓	✓	✓
	Jayson Oldfather	✓	✓	✓	✓	✓	
KCG	Jay Miller	✓					
	Jason Zink						✓
	Michael McLaughlin						✓
	Stefanus Du Toit	✓	✓	✓	✓	✓	✓

14.3 JTC1/SC22/WG21 technical experts

Heads of delegation designated with *.

Affiliation	Representative
Netherlands	Bjarne Stroustrup*
Canada	Michael Wong*
Canada	Stefanus Du Toit
United States	Barry Hedquist*
Germany	Nicolai Josuttis
Germany	Peter Gottschling*
Switzerland	Peter Sommerlad
Switzerland	Detlef Vollmann*
Spain	J. Daniel Garcia*
United Kingdom	Jeff Snyder
United Kingdom	Roger Orr*
Finland	Ville Voutilainen*
Finland	Mikael Kilpeläinen