

Doc No: SC22/WG21/N3274
PL22.16/11-0044
Date: 2011-04-08
Project: JTC1.22.32
Reply to: Stefanus Du Toit
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Minutes of WG21 Meeting, March 21, 2011

1. Opening activities

Clamage called the meeting to order at 10:00 (UTC+1) on Monday, March 21, 2011.

1.1 Opening comments, welcome from host

The host welcomed the attendees and provided some organizational information.

1.2 Introductions

Clamage had the attendees introduce themselves.

1.3 Meeting guidelines (Anti-Trust)

Clamage reviewed the patent disclosure rules.

The following materials were displayed without any further interpretation or discussion:

http://www.incits.org/pat_slides.pdf

<http://www.incits.org/inatrust.htm>

1.4 Membership, voting rights, and procedures for the meeting

Clamage reviewed the rules for membership and voting rights. Nelson reviewed guidelines for filling in the attendance sheet.

Clamage noted that 8 WG21 National Body delegations were present:

Canada, Finland, France, Netherlands, Spain, Switzerland, UK, US

1.5 Agenda review and approval

Clamage presented the agenda (document PL22.16/10-0210 = WG21/N3220).

Motion to approve the agenda:

Moved by: Hedquist

Seconded by: Clark

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

1.6 WG progress reports and work plans for the week

Sutter reviewed the rules for the current state of the draft standard. He explained that several straw votes would be taken on the most controversial issues – removal of certain features - in order to determine whether discussions should be had in order to increase consensus.

Joly asked whether vote would be by person or by National Body. Sutter answered that they would be taken by National Body, the same way as motion votes are taken.

Spertus asked how one should vote if one didn't want to remove a feature, but thought there were aspects of the feature that should be discussed. Sutter answered that if there were bugs in a feature, the group would handle those as such, and that the vote taken would be purely on whether to remove the feature.

P.J. Plauger asked whether it would take an overwhelming “yes” on one of these votes to talk about the removal of a feature at this meeting. Sutter confirmed that the bar was very high to make changes.

Gregor asked whether the group would have any discussion prior to these votes, or whether they would be taken based on what was discussed on the reflectors. Sutter answered that the group would have an opportunity to discuss when asked to vote.

Straw Poll: Remove user-defined literals?

Gregor noted that paper N3250 included some discussion of this. He said there was no implementation experience that he knew of and no no user experience. He noted the

feature was self-contained, unused by the library, and had a syntactic conflict with C99 hexadecimal floating point constants.

Miller noted that, although the grammar did allow for a conflict with hexadecimal floating-point, a semantic restriction in the library clauses (not restricted to programs using the library) disallowed the conflict in actual programs. He added that there was a proposal to move this to core wording to make it clearer.

Wong stated that IBM's management had agreed to allow him to inform the group that IBM had implemented user-defined literals. He said that the implementation was intended to ensure that it worked well with other features, e.g. variadic templates. He reported that it had been tested with decimal floating-point and that he could demonstrate usage of this. He finished by stating that IBM felt that this feature should not be removed.

Hinnant had a comment regarding the C99 conflict. He noted that, currently a violation would cause undefined behavior, whereas he would prefer to require a diagnostic.

Miller suggested opening a core issue that would make it an ill-formed program always.

PL22.16		WG21	
In favor:	4	In favor:	0
Opposed:	8	Opposed:	8
Abstain:	10	Abstain:	0

Sutter reported that there was no consensus for a change.

Straw Poll: Remove non-static data member initializers?

Gregor noted that CWG discussed this at a recent meeting. He stated that there was some implementation and usage experience from a very similar feature in the C++ CLI world. Gregor reported that at the time of discussion, the issue was closed as no consensus for a change, and that there was no paper in this mailing to remove the feature.

Sutter noted that the issue was not listed as closed in the latest status report. Miller suggested this may have been due to an administrative error.

Orr noted that there were interactions with inherited constructors, and that removing one but not the other might not increase consensus.

PL22.16		WG21	
In favor:	1	In favor:	0
Opposed:	15	Opposed:	6
Abstain:	7	Abstain:	2

Sutter noted that there was no consensus for a change.

Straw Poll: Remove move semantics for *this?

Gregor reported that this feature had been implemented in clang, and that it had been turned on in the standard library. He reported that based on this experience, the specification appeared to be good and the feature seemed to work well.

Du Toit asked for a brief explanation of the feature. Gregor explained the feature, allowing someone to place an lvalue reference or rvalue reference at the end of a member function declaration to restrict the objects on which the member function could be called.

PL22.16		WG21	
In favor:	1	In favor:	0
Opposed:	19	Opposed:	8
Abstain:	3	Abstain:	0

Sutter noted that there was no consensus for a change.

Straw Poll: Remove inheriting constructors?

Gregor reported that paper N3258 explained this request. He stated that he was very concerned about this feature, since there was no implementation experience on this committee and certainly no usage experience. He added that he was very concerned about interactions with C-style variadic constructors, which might require an ABI change, which he stated was an issue. He went on to say that the cost of removing this feature was fairly low since no-one currently appeared to depend on it.

Voutilanen noted that there apparently was an implementation, as reported by a Russian compiler vendor called Interstrom.

Gregor stated that this did not address the potential issue with C-style variadic constructors.

Hinnant asked whether the group knew if the implementation was written to the Itanium ABI. Voutilanen responded that he did not know.

Joly asked whether any paper described the specific technical problems. Gregor reported that he did not know of one at the moment, but believed there was reflector discussion.

Halpern said that this feature could go into another version of the standard without causing major headaches in integrating. He asked whether there was any strong reason this needed to be in the current standard.

P.J. Plauger noted his company did not use this in their current implementation of the library. He added that there was one user-reported bug that he thought could only be solved with this, but he had since then discovered could be solved even without it.

Marcus noted that there was some discussion previously allowing the ABI to be broken. He asked whether vendors currently felt the group was not requiring ABIs to be broken.

Stroustrup stated he did not think the feature should be removed, as it completed the language in the area of using base classes. He said that any feature initially was not necessary, and gave the example of having had two years of discussions around whether to support virtual member functions. He added that work-arounds for lack of this feature was not something he would expect users to be able to do.

Gregor stated that he liked this feature, and would like to see it in C++, just not in C++0x, to allow for more time to resolve ABI issues.

Sutter noted that he would be looking for near-unanimity to change previous consensus on these issues.

Vandevorde responded to Marcus's question, stating that the only changes to the ABI were new manglings and new types of values. He claimed that without inherited constructors, there was no need for a new runtime, allowing a C++0x program to run on top of existing runtimes.

Marcus asked whether that was true until this feature was added. Vandevorde answered that he was not familiar with the exact ABI issues, but that there were similar issues around exceptions and the group had tried to maintain ABI compatibility.

Marcus noted that at Adobe, ABI compatibility was a huge concern. He felt that the feature was desirable, but that if there were adoption concerns due to ABI breakage, to him those would seem to outweigh the usefulness.

Orr asked why delaying it would not cause the same problems later. Vandevorde answered that vendors preferred to break the ABI for a number of reasons at once, rather than doing so for a single feature.

Crowl noted that the community did not like ABI breakage, and that it was already being broken due to changes in library. He stated that if this feature was going to break the ABI, the best time to do so was now, because otherwise the group would not be able to do so for at least a decade.

Hinnant explained that there were different ways in which the ABI could be broken. He stated that breaking the ABI in a way that recompiled code would not run on an older runtime was very bad – but when breaking the ABI in `std::string` for example, there were tools and versioning that allowed this to be dealt with. He stated that breaking the ABI at a high level, rather than a low level, was not a concern, at least for Apple.

Clamage noted that inline functions made this a problem. Hinnant answered that Apple was dealing with that specific problem using inline namespaces.

Marcus wanted to confirm that there was some form of ABI breakage already, but it could be avoided with some creativity, but that the same could not be done for the API breakage introduced by inheriting constructors. He asked whether this assessment was correct.

Gregor answered that he would not put this in the class of “horrible” ABI breakages, e.g. breaking the low-level exception model. He explained that when dealing with C-style variadic constructors that are inherited, vendors might need to change the ABI. He stated that it was something that could be dealt with, but that it was a pain for such a minor feature. He stated that while there were ABI issues, he would not consider it a major breakage in ABIs.

Clamage asked whether, therefore, if someone was not using inheriting constructors, there would be no breakage.

Sutter stated that even though the recent comments made the issue sound smaller, he would consider this a litmus test in terms of whether it was a “stop-ship” bug. To him, he said, this type of ABI breakage did not qualify as a stop-ship bug, but it may for others.

Vandevorde asked whether Sutter was speaking for Microsoft. Sutter answered that he was speaking for himself personally.

Sommerlad stated that as a teacher, he was teaching students who had a lot of Java experience, and was always being asked if inherited constructors were possible.

Spicer wondered whether they would not want delegating constructors instead. Sommerlad answered that they wanted both, but specifically that there were cases where inheriting constructors were desired.

Spicer asserted that the same issue existed in Java. Sommerlad confirmed that this was the case.

Stroustrup stated that he had seen the same phenomenon among students at all levels.

Sommerlad suggested another use case, given the lack of concept maps, that just changing the interface of a class using inheritance could make use of inheriting constructors.

Gregor noted that these were all great arguments for this feature, but asserted that the group did not have the experience to know that they were addressing users' needs. He considered it a gamble to take on this feature, and a risky one, since the group would not be able to fix it later.

Joly stated that the opposite could be said as well, in that the group did not know that the feature was broken.

Gregor stated that he viewed the group's role in the standardization committee as putting something into the standard that had been tested, and that that was not the case here.

Vandevoorde responded to Joly, saying that the group's experience with new features was that whenever someone implemented a feature, bugs that require changes to the standard would be found. He added that it never happened otherwise.

P.J. Plauger said that nobody in programming had ever done anything non-trivial without having to massage and iterate. He claimed that one could not get it right the first time, and there would always be bugs. He added that nobody was smart enough to get something of this level right the first time.

Sutter announced that he intended to have a deep discussion on Saturday regarding having implementation experience vs. promoting feature implementations.

Gregor stated that if someone wanted an example of a bug, exception specifications on inheriting constructors were wrong.

Voutilanen asked whether there were open core issues for these bugs. Gregor answered that there were not, but that some would be filed soon.

Stroustrup stated that the group was, of course, going to ship with bugs, and that this feature would add something to the already not significant total number of bugs the group was shipping with. He stated that he did not believe the group should delay for another ten years.

PL22.16		WG21	
In favor:	7	In favor:	0
Opposed:	7	Opposed:	6
Abstain:	9	Abstain:	2

Sutter noted that there was no consensus for a change.

Straw Poll: Remove explicit from class-head?

Miller said he did not think the group was ready to discuss or vote on this at this level. He said that there were several proposals on the table, and this was only one of them. He claimed that the group had not explored that design space well enough yet to have this on the list.

Voutilanen noted that the proposal was to do damage control, and that he did not think the group was ready to have the discussion. He noted that the outcome could be dependent on what the group decided to do with the new annotations in general.

Sutter asked whether there were any objection to removing this straw poll. There were no objections.

Straw Poll: Must we try to fix range-for (is it broken in a primary use case)?

Sutter said that it sounded like something was fundamentally broken where the feature simply did not work for a primary use case, such as examples from the original paper simply not working. He noted that he would like to understand if that was the case.

Plum stated that this was already on the agenda for Core group, and that he did not see it adding anything to take full group time this morning, unless there was a possibility of some consensus for Core to not even discuss it.

Sutter stated that the paper proposed a change in functionality, which sounded like a new feature, so the only way we would discuss is if the feature were fundamentally broken.

Woodcock stated that there was a proposal to change the names that would be very simple.

Sutter responded that that would still be a new feature, because it would then be possible to write programs with the new names.

Halpern reported that he had followed the arguments on the reflector, and got the impression that there was some pessimism on the reflector discussion as to whether the group could ever resolve this. He disagreed that it was hopeless, noting that e-mail discussions could degenerate that way. He felt that with people interested in this topic in a room together, the group could probably come up with something that was better than what they had now. Therefore, he concluded, he was in favor of discussion.

Meredith stated that the new for-loop worked great when the draft had concepts, but that usage experience showed an ambiguity. He stated that the group needed to focus to be productive and get past this.

Sutter said that how to arrive to consensus was the next question, and that this was really just to determine whether the feature truly was broken or not.

Stroustrup said he had heard people on the reflector saying that it was broken, but was not sure he agrees. He suggested the group get consensus both on the existence of the problem, and on the solution. He noted that if the group were to agree on anything, it would have to have been written up before. He noted that someone proposed to write a paper, but it did not happen initially, and that stirred up a great deal of discussion again. He reported that the paper was then finished, and provided clear options, but it seemed that people were not agreeing on a single solution, even though the status quo was broken. He suggested the group should have a brief discussion on picking out the way to solve it amongst the 5 options, and then work out the technical details. He said he would like to see a short discussion on which option to take, and then work from there. He noted that the issue touched both Core and Library, but suggested not talking about it in full committee too long.

Sutter suggested that if the issue were talked about in full committee at all, the group would want to time-box such discussion aggressively.

Dawes asked whether this meant things would just be dropped on the floor if they were not stop-ship bugs. Sutter responded that it was late to discuss any new features.

Dawes noted that all issues in library could conceivably add new features, but those involved would not allow that to happen. He felt it seemed this could be addressed by Core and Library discussions.

Nelson said that part of the reason why this was on here is that there was no NB comment. He noted that the question was whether we really needed to do something about this, even if it required some major and unanticipated change.

Dawes said he could not vote on this question. He said it was the kind of feature you could ship as-is, but it would be embarrassing. He noted that the concerns did not come out of the committee, but rather from a user community, specifically Boost.

Sutter asked if Dawes was saying the problem was a stop-ship due to embarrassment. Dawes answered that he would not go that far, but did it would be embarrassing.

Sutter asked whether this discussion helped Adamczyk's question as to whether this should be discussed.

Adamczyk answered that he agreed with Dawes that it would be nice to fix this. He said that the fear was that there was no consensus, and therefore there would be a great deal of discussion time spent on this in committee time. If people wanted to discuss this issue outside of official time, he said, that would be fine. But if it were to be discussed in committee, he added, he would want to restrict that to something like 1.5 hours. He said he was hearing that there was still a difference in opinion on this, and he was concerned the group might spend an entire day on this topic.

Sutter said he was hearing from Adamczyk that, if everyone could discuss this offline, he would then be willing to spend some set time on this. Adamczyk confirmed that this was the case.

Halpern asked whether the group was proposing a specific time to discuss this that interested parties could attend. Adamczyk answered suggesting a 1.5 hour session Tuesday morning.

There was general agreement.

Sutter noted that even if everyone agreed that the status quo was bad, the group still needed consensus on a solution in order to make a change.

Progress Reports

Each of the Working Group chairs presented their progress and plans for the coming week.

Core Working Group (CWG)

Adamczyk reviewed the Core working group status. He reported that there was essentially nothing critical left, and the group had a significant number of things to review with wording ready. He noted the group had about 20 issues that still required wording. Overall, he reported, there were a large number of issues, but he believed those could be resolved in a timely fashion. He said that the group did have a number of papers, many of which were unlikely to be discussed at this point, with exceptions such as the range-based for issues.

Sutter asked Adamczyk whether it was true that there was one remaining NB comment, but no stop-ship issues.

Adamczyk said there were likely no stop-ship issues. He said there were only “should fix,” as opposed to “must fix,” issues left. He noted that any remaining comments to be discussed were considered relatively minor and in many cases would simply not have consensus for a change, which was acceptable.

Sutter noted that in the published list, there were exactly 5 core NB comments that were still open, 4 of which were closed this morning.

Miller reported that priority 2 NB comments were resolved, unless someone raised a red flag.

Sutter therefore understood that CWG would be done with critical issues before the end of the meeting. Adamczyk confirmed that in fact they may actually be done already, and added that he would check to be sure.

Halpern noted that a number of issues had been categorized as editorial but were rejected by the editor as being technical. He asked whether Core or Library had an agenda to look at those, noting it should not take up a lot of time, but should be handled rather than left broken.

Adamczyk stated that he would check into them.

Halpern noted that they were listed in the Editor’s report.

Becker noted that almost all of those decisions were made under initial triage about a year ago, and that he believed that most of them had been looked at by Core or Library.

Meredith agreed it was important to review these now.

Becker noted that specifically, he did not change anything from editorial to technical in this round.

Library Working Group (LWG)

Meredith reported that the group had about 10 papers, and about 20 issues on the issues list, but that there was a big overlap between issues and papers. Given the workload achieved in previous meetings, he said, going through these was achievable. He noted that there were an additional 30 to 40 issues reported since the NB ballot, and that he would check to see if any of those were stop-ship, but that he expected the majority to be deferred.

Concurrency Working Group

Crowl reported that the group had one paper to look at, and one significant issue, exception pointer race safety. He stated that the group had had a meeting last week with C, resolving a number of issues between C and C++, with some resolutions in C requiring proposed resolutions for C++ to be accepted as they were. He added that, if, unexpectedly, wording were not to be adopted as expected, C would have an editorial meeting to resolve any conflicts.

1.7 Approval of the minutes of the previous meeting

Motion to approve the minutes (N3212/N3213)

Moved by: Du Toit

Seconded by: Liber

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:		Opposed:	
Abstain:		Abstain:	

1.8 Liaison reports

WG14 Report

Plum reported that the technical details remaining were almost exclusively in Concurrency.

Clamage asked what the current status of the C standard was.

Plum stated that it was about ready to go out for the DIS.

P.J. Plauger said he felt the C committee had tried very hard, especially in atomics, to reconcile the C standard with where WG21 thought atomics were going in C++. He hoped, therefore, that this committee would aim to make this work.

WG23 Report

Hedquist noted that WG23 was meeting this week in Madrid as well.

1.9 Editor's report

Becker reported that N3242 had all the Batavia changes. He noted that the primary difference in N3242 was structural, rearranging clause 20 in Library, and also improving the index.

Motion to approve document N3242 as current working draft

Moved by: Plauger

Seconded by: Meredith

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:		Opposed:	
Abstain:		Abstain:	

1.10 New business requiring actions by the committee

There was no new business.

2. Organize subgroups, establish working procedures.

Clamage announced that those present would be breaking up into working groups until Friday. He noted that the committee was in recess until then.

3. WG sessions (Core and Library, possibly Concurrency, Evolution).

The group broke up to meet in separate working group sessions.

Tuesday, March 22, 9:30am-6:30pm

4. WG sessions continue.

Wednesday, March 23, 9:30am-6:30pm

5. WG sessions continue.

Thursday, March 24, 9:30am-6:30pm

6. WG sessions continue.

Friday, March 25, 9:30am–1:00pm

7. WG sessions continue.

Friday, March 25, 2:30pm–6:30pm

8. General session.

8.1 WG status and progress reports.

Core Working Group

Adamczyk presented the Core Working Group status. He noted there were two issues particularly worth mentioning. He explained that consensus was reached on the issue of “range-based for” and a paper with wording had been placed on the formal motions page.

Adamczyk reported that the other controversial issue was around hiding, overriding, and similar topics. After some discussion, he said, the group had decided to keep “final” and “override”, but to remove “explicit” in the class head, and “new” as it was used to decorate members with regards to these issues. He noted that some vendors in fact implemented the specific features that were kept and that users were trying these out. He explained that the vote on this was nearly unanimous, and other options did not reach consensus. Therefore, he noted, the working group posted a paper taking the approach that had reached consensus.

Library Working Group

Meredith reviewed the motions proposed and the status of the Library Working Group.

8.2 Presentation and discussion of proposed responses to public comments. Straw votes taken.

The following motions had discussions prior to the taking of straw votes.

Core Motion 8

Move we apply [N3272](#) "Follow-up on override control" to the C++0X Working Paper.

Halpern asked, from a procedural standpoint, whether this was in direct response to an NB comment, and if not, how the group saw this playing out.

Adamczyk asked how BSI felt about this.

Orr said that the group had something, and it didn't preclude further development. He added that the suggestion had been implemented and seemed to be OK.

Adamczyk responded to Halpern that, if the question was whether the last change had been in direct response to an NB comment, it had not. But, he added, there were several NB comments around this.

Sutter said he made a big point at the beginning of the meeting that we shouldn't be removing features – that we could do it, but only if we thought it was broken. He added that it was always valid to say "there was no consensus on the design of this feature" to Geneva.

Adamczyk agreed that that was truer than ever in this specific case – the group definitely would not have had consensus on the parts being removed, but the group did have consensus on the parts remaining.

Library Motion 8

Move we apply the proposed resolution from [N3279](#), Conservative use of noexcept in the library, to the C++0X Working Paper.

Vollman explained that, in the last meeting, the group had voted in a paper that liberally added noexcepts, and while doing so, noted a number of places where the draft said "noexcept" but didn't say "Throws: Nothing". This paper, he stated, reverted these occurrences to their previous state.

Concurrency Motion 3

Move we apply paper [N3267 - A review of noexcept in the threads library \(revised\)](#). This paper addresses CH 16 and GB 60.

Lakos asked whether someone from the library confirmed that the same rules were used for that motion. Meredith answered that he believed the guidelines were understood by the group doing the review. Wong confirmed that he checked the guidelines with Halpern several times.

Concurrency Motion 4

Move we apply paper [N3269 - shared_future\(future<R>&& rhs\) should be allowed to throw](#). This paper addresses a defect discovered in the process of formulating N3267.

Vollman explained that his main objection to this during discussion had been that this came in on Tuesday afternoon, and it had not been clear what the consequence of this was. He postulated that a number of idioms with `shared_future` might not work anymore, and that no-one had had time to check what those features were. Therefore, he said, he was very strongly opposed to making this quite radical change without an NB comment at the last minute, and without really giving someone time to look into it. He agreed this was the more conservative approach, and that it could be tightened later. The interesting point however, he noted, was that all current implementers did not throw anything, and this had been around for quite a while, used by a number of people. If the group thought that the current status was really a defect, he explained, someone could still open an issue. He concluded that he was really strongly opposed to make this change at that time.

Crowl observed that a big part of the issue here was how "being conservative" was interpreted.

Garcia asked Vollman whether, if the “noexcept” were removed but the text “Throws: Nothing” were provided, he would be OK with the result.

Vollman responded that the FCD included “Throws: Nothing”, and that now the draft had noexcept, which was according to guidelines.

Garcia asked Vollman if he was sure. Vollman said that he was, stating that the CD did not contain “Throws: Nothing”, but the FCD did.

Orr said he suspected the BSI panel may have a view on this, and that he was seeking clarification.

Meredith stated that the contract already said it was not allowed to throw.

Halpern stated that that was what was under debate - there were people that wanted to allow it to throw, and this had nothing to do with being out of contract.

Meredith responded that his point was that use of “noexcept” vs “Throws: Nothing” was appropriate.

Sutter asked, Orr having mentioned the question of caucusing, whether this was the only motion on the motions list that had not been on the agenda. Crowl responded that he thought that was true in Concurrency.

Sutter stated that someone in PL22.16 could object procedurally to this.

Dawes stated that there were two library issues that were opened at this meeting, and cleared, because it was discovered that there were NB comments that an issue was never opened for. So, he explained, in one sense, the issues were very new, but they in fact were NB comments and were issues that were possible to clear immediately without controversy.

Sutter asked whether this particular issue was an NB comment. Crowl responded that in the minds of the people proposing this, it was a bug fix that had been discovered in the process of acting on NB comments. Sutter clarified that he was not intending to object, just testing to see what the status was.

Sutter stated that, ignoring being at the FDIS meeting, if an issue came up, we would never resolve it at the same meeting as it was opened. He asked whether that was the way this issue would normally have been handled a few years ago.

Crowl responded that, yes, it would have been handled that way, but more pro forma.

Sutter stated that usually the group did not do this because it gave people more time to review.

Crowl noted that there were a number of issues where the group had done wording changes this week due to time constraints.

Sutter asked whether this was for NB comments.

Crowl stated that some were issues at this meeting that the group had provided new wording for.

Nelson said that rushing this in would require some kind of exceptional circumstances. He noted that the question was what the impact of having the status quo in C++0x would be.

Crowl said that if the standard did not have noexcept, one could later add it without breaking binary compatibility, but that it would be much harder to remove it.

Dawes said that therefore this change was far more conservative than letting the working paper go out without this change.

Sutter said that regardless of which way this was decided, the group should already consider opening a DR to look at this again.

Crowl said that for a lot of things, that worked, but once one had binaries out in the wild, then the usual response would be that it can't be changed, noting that this had come up in the past already.

Joly asked, if it were just switched to “Throws: Nothing”, whether there would be no ABI incompatibility, and it could therefore just be removed.

Crowl responded that that would not help, because it was not the fact that it did not throw, the group wanted the ability to throw.

Crowl said that the problem was that the group believed that the change from CD to FCD had been a mistake.

Joly said that if the group wanted to follow the usual procedure, they would wait until next meeting.

Crowl agreed, and stated that normally that would be no problem because there would be no commitments in the binaries.

Joly commented that if one added noexcept it would change the API, but if one just added “Throws: Nothing”, it would not change the API.

Crowl stated that this was irrelevant, because the group wants to be able to throw exceptions from this function.

Dennett stated the point was that if the group did add “Throws: Nothing” now, they could still change it later without breaking compatibility.

Crowl responded that this was not the case, because it changed the assumptions people could make when calling this code.

Garcia asked to confirm that the group wanted to be able to throw from this constructor, but would not specify under which conditions. Crowl confirmed that this was the case. Garcia noted that this seemed strange.

Kruegler said he did not think it's so strange, because there are other places where the draft said this.

Lakos said that “noexcept” did not belong here because there was no consensus on whether to throw.

Hinnant said that all vector constructors did not have a throws clause but clearly could throw.

Dawes explained that Chapter 17 allowed any library function to throw unless otherwise specified, and the usual one is “bad_alloc”.

Meredith responded to Lakos that this was a wide contract, and the only way this would throw is with a buggy implementation, not due to a user problem.

There was some more discussion.

Du Toit said that there were no doubt other problems like this, and he did not see changing this specific case significantly improving the standard. Procedural concerns, therefore, he felt, argued against making this change now.

Some more discussion ensued.

Lakos thought that the safest thing to do from an engineering basis was to remove the “noexcept”, and keep the options open. He asked whether that was Crowl's position. Crowl confirmed that it was.

Vollman explained that this issue had surfaced because Sommerlad had discovered that with the current rules, some optimization might not be possible that some implementers might want to do in the future. No current implementation, he claimed, had any problems with throwing nothing. Vollman stated that Sommerlad had in fact discovered that the optimization may even be possible without throwing. Vollman said that this lead him to believe there had not been enough discussion.

Sutter said that given the timing of this and mission to increase consensus, he would want to see almost unanimous consent on this to make a change.

Some more discussion ensued on Sommerlad's intended optimization.

After a straw vote, Clamage announced that the motion was not carried and would be struck from the Formal Motions page.

Other Motion 1

Move we appoint a review committee consisting of Steve Adamczyk and Alisdair Meredith to approve the Project Editor's updated Working Paper amended by the foregoing motions, and request the Convener to forward the approved Working Paper to ITTF for Final Draft International Standard (FDIS) Ballot.

Maurer said he thought the name was not FDIS anymore. Sutter clarified that it was still called FDIS, and that what had been FCD was now DIS, but that FDIS remained FDIS.

Becker stated that he planned to vote against this, because he had not yet seen the paper produced. To use an analogy from software development, he explained, the group had done its review of the bug list, checked the changes in, but there were still steps to be taken – it had not built the product yet. He felt that this was a pretty good analogy for what the group had here. He said that the group had not yet seen the final draft, and that it would be good to check that the fixes were applied correctly. Until the group had seen the draft, he said, it could not make a good decision.

Sutter said that the point was well taken, but that this is however the way the group has always done it. To him, he said, he had always viewed the CD as the alpha - ready for some early feedback. He saw the FCD like a beta, thinking it's feature complete and wanting feedback from the outside world. He said that once one got to the stage the group was at now, about to ship the gold master, and having identified final changes to avoid stop-ship, one would want to make sure one got those in correctly. He said that the group knew they would ship with bugs, but that the current goal was no stop-ship bugs.

Du Toit said that his understanding was that that final review was the exact purpose of the review committee, and asked for clarification.

Plum said that the problem was, if one attempted to slow down the deliberative process of WG21 to accommodate further checking, one would have all of the corner cases come up in which people argue about whether the so-called checking was really introducing new features, just as was seen with the last vote – where one could argue both ways as to what would be the conservative cause. He said that the group did have the DR mechanism for dealing with defects in an International Standard. His intuition, he noted, was still that the group really has to ship it in the best way they could and deal with defects in the defect process.

Spicer asked what process Becker would like to see.

Becker stated that this was different from a CD because it was the final commitment. He said he would like to see more time for people to look at the resulting draft, and thought this ballot should be taken at the next meeting to allow looking for more stop-ship bugs. He said that this was like the critical final step in software development, and that it was necessary to look at the final document and be sure it really said what the group wanted it to say.

Wong asked if there was a place to checkpoint between meetings in any way. Sutter responded that the group did have another WG21 teleconference scheduled, and that such a meeting could be scheduled on two weeks' notice.

Meredith stated that his purely personal opinion is that he is very comfortable with shipping this this week, but that he was also comfortable with what Becker was suggesting. He stated that he did want to know what changes Becker expected to be done, and asked, if new things came in from the review, whether these would be editorial or technical.

Becker responded that editorial issues were always in scope, but that it would be looking for stop-ship bugs, and that anything that wasn't stop-ship wouldn't get dealt with.

Sutter said that there would never be a meeting in which we did not approve changes, and that the group would never be in a different state than they were now.

Sutter explained that this was a ballot resolution meeting. He said that the group was done ballot resolution, and if they didn't ship this, he is not sure what the group would do, because they would not be allowed to do anything else.

Nelson said that he very much sympathized with Pete here, but that there was a difference between software and a specification document. He said that software was hard, and if one actually shipped a program, one might introduce a problem that caused a crash on startup. He explained that documents didn't work that way - certainly there were bugs, but he has had a hard time figuring out what "stop-ship" really meant for a document. He concluded that he tended to agree with Plum that it was better to get the document out as a whole and then worry about the problems.

Adamczyk said that at first he wanted to say that he had enormous respect for Becker, so he was uncomfortable even disagreeing. He related something he was going to say that afternoon, which was that not that many people here now had been here for the '98 standard, and if they had not been there, they would have no idea how much better the group was off today.

Applause ensued.

Adamczyk said that the group had this process and stuck with it, and everything that's in there had been reviewed - at least speaking for Core. He said that that was not at all the case for the '98 standard. As Nelson mentioned, he noted, the group talked about 4-5 issues this week where it was clear the draft was not done. He said that implementers would look to the standards process for course corrections, but having shipped the standard put a great stake in the ground as to what features were included.

Adamczyk concluded that he thought it was time to ship this thing and make the statement that this is the stake in the ground.

Miller said he didn't know how this interacted with the ISO rules, but he had the idea that the group could either ship now or ship in August. He asked whether it would be possible to have a letter ballot between now and then. Sutter answered that that would be a PL22.16 letter ballot, as there was no such thing as WG21 letter ballot.

Miller said that there presumably would be a delegation by WG21 to PL22.16 on this matter. Sutter responded that, even if there were a PL22.16 ballot in between these meetings, he would still have to poll NBs himself, to find out the equivalent as is done with straw polls to attain whether there was consensus.

Miller asked whether, therefore, it would take as long as approving in August anyways. Sutter confirmed that it would.

Liber said he didn't see what the real shipping criteria would be, adding that he had seen many different kinds in software, all of which were not exactly the same.

Stroustrup stated that the group was in a better shape now than they had ever been, that they were not going to get perfect, and that this wasn't the time to invent new process - "ship," he concluded.

Kruegler asked what the consequence of a stop-ship bug would be if we found one now.

Sutter said that the only real issue would be if someone found something that wasn't introduced as intended, or if there were a self-contradiction, in which case the group would reopen the issue in August. Otherwise, he said, it would go through the defect report process.

Halpern asked what the timescale for Becker was to make the edits, and for the group to approve them.

Sutter said that he expected around 2-3 weeks of editing, and that the Secretariat was ready to receive the document.

Becker said that that was correct but irrelevant, because the group was talking about voting on something now that it hasn't seen yet.

Sutter noted that the group had been using this process since the 90s.

Hedquist agreed.

Van Winkel said he was a bit worried that if one said "there will always be errors", one might have the same sympathies in August. He felt that the group might always be in this cycle and could not go forward.

Becker said that he was suggesting to vote on the final draft, rather than what the group thought it was going to look like.

Dawes said that Becker's point was well taken, but because ISO didn't have a procedure set up to deal with this, we could not do much about it. He added that one option would be to amend the motion to say "and request the Convener after consultation with the Officers".

Sutter said that those were the people one would want in the review committee.

Dawes said that the group could specifically call out more people to give the thumbs-up.

Adamczyk said that the group had a process like this for the FCD, and that the reality was not that two people read the draft and approved it. He reported that during the FCD, 15-20 people contributed to reviewing things, and the vote of the final two people took into account the view of all of those people.

Adamczyk said that if there was any person who wanted to see a final copy of the document and could commit to turn around a review in a few days, he would never object to that.

Becker said that he was fine with the review procedure as a way to assure ourselves that the changes got in correctly, but that it was not until he had seen the final document though that he would feel comfortable voting. He said he thought the vote was premature because the group hadn't yet seen the document.

Sutter said that any book written by anyone here had an errata, and that a first copy and the errata was as good as the current printing.

Becker said that he couldn't say that the final document didn't have big enough holes in it that it would be appropriate, and that he couldn't vote yes if he hadn't seen the document.

Seymour asked to see a division of the questions into two motions, one to create the review committee, and the other to give instructions to ship.

Sutter said that he could divide it but there was no point, since the group would not have a review committee if they were not to proceed.

Vollman asked what the group would be allowed to do if they didn't vote a document out during this meeting.

Sutter responded that the group could not discuss a document currently under ballot, but could work on TRs, DRs of this document as long as papers weren't voted on. Could do some work, but couldn't talk about making any official changes.

Hedquist said that the question was not what the group could do if it were in ballot, but rather what the group could do if it were not in ballot. If it were not in ballot, he noted, the group could do anything they wanted.

Plum said that at some point the group had to say that the disposition of comments was finished. He noted that just a few minutes ago the group was pretty sure it had finished disposing of the comments, and that he didn't know how much leeway ISO gave one between saying one was finished disposing comments and shipping an FDIS.

Sutter said that, speaking to that, that was partly what he had meant earlier when he had said this was a ballot resolution meeting and therefore the group didn't have standing to do other work. He reminded the group of the rules change last year, where the main change was FCD being renamed to DIS. He explained that one of the new rules was that there were very tight timelines, with about 2-3 months to do ballot resolution and push out the document. He said that ISO wanted the group to move faster on this.

Maurer said he sympathized with Pete's desire to see the final document, but that reality was simply that the group wouldn't be able to do things like vote for the document in August. He said that the world simply did not work that way in the way the environment was set up.

Crowl said that Sutter had a comment in the last meeting about a particular deadline, and asked what it was.

Sutter said that that was a different deadline for SC22, which had already been extended twice, now to August 31, which was why the Fall meeting was scheduled before then, only in case the group did not complete ballot resolution this meeting.

Dennett said that there was lots of pressure to ship, and thought it was great that Pete was standing up for quality. He thought this motion is trying to recognize that, and he wanted the final decision to be based on the final document, and therefore delegate responsibility to the small group of people. He said that that was the best we could realistically do.

P.J. Plauger said he was ecstatic when Becker signed up to be project editor, and he was happy that the most finicky person in this room was the project editor. However, he added, having done standards for over 30 years, this was always how it had been done. He concluded that, with all due respect to Becker, he expected Becker would be the only No vote.

~~9. WG sessions continue~~

~~10. WG sessions continue~~

11. Review of the meeting

Clamage stated that the current agenda called for working groups in the morning and a final session to finish the process. He explained that it had been set up that way because the group did not think they would have enough time, but instead everything got done. He suggested that one option was to meet tomorrow morning, and another was to meet now.

Applause ensued.

Clamage stated that the only concern was people who were planning to be here tomorrow and were not here today.

Plum said that based on the current straw polls it would not affect the outcome.

Clamage asked whether there was anyone who needed to spend time with their parent body before returning to vote. No-one spoke up.

Kruegler asked whether anything could change otherwise. Clamage answered that it could only if new information came up, which was unlikely.

Sutter said that there were several requests to use the time in the morning, but after seeing the votes, he was convinced we could conclude today.

Meredith said that LWG would continue to work regardless, to determine future plans for a TR. Clamage responded that that was acceptable.

Joly said that it would be quite interesting to have some discussions about the future, if it were at all possible.

Sutter said he had planned on doing that, and was ready to do it now.

Orr said that members of the BSI panel may want to discuss before tomorrow. Clamage responded that Orr would need to determine whether that was a serious objection or not.

Plum said that, on the point about having had a published agenda, it had never been objected to a WG finishing early on procedural grounds and was commonly done.

Sutter noted that, in fact, WG21 had done this previously in Sofia-Antipolis.

Spicer said that some folks might want to spend time other ways rather than show up tomorrow just to have a vote.

Clamage asked for any objections to conclude the meeting without break. There were none.

11.1 Motions

Core Motions

Motion 1

Move we apply the resolutions of all issues in "Ready" and "Tentatively Ready" status from [N3236](#) (except for issues [355](#), [1060](#), [1151](#), [1197](#), [1199](#), and [1207](#), which are covered by papers in motions below) to the C++0X Working Paper.

- **Ready:** [573](#) [981](#) [1022](#) [1071](#) [1073](#) [1080](#) [1081](#) [1094](#) [1111](#) [1120](#) [1135](#) [1136](#) [1137](#) [1140](#) [1145](#) [1149](#) [1167](#) [1187](#) [1193](#) [1198](#) [1208](#)
- **Tentatively Ready:** [407](#) [572](#) [696](#) [938](#) [993](#) [1030](#) [1044](#) [1054](#) [1068](#) [1091](#) [1096](#) [1099](#) [1100](#) [1170](#) [1181](#) [1191](#) [1201](#) [1218](#) [1240](#)

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 2

Move we apply [N3259](#) "Core Issue 355: Global-scope :: in elaborated-type-specifier" to the C++0X Working Paper.

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 3

Move we apply [N3260](#) "Consolidated corrections for a cluster of constexpr concerns" to the C++0X Working Paper (covers issues 1060, 1100, and 1197).

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 4

Move we apply [N3262](#) "Additional Core Language Issue Resolutions for Madrid" to the C++0X Working Paper (covers 65 core issues with mostly small edits, including 1151).

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 5

Move we apply [N3268](#) "static_assert and list-initialization in constexpr functions" to the C++0X Working Paper (covers issues 837 and 898).

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 6

Move we apply [N3270](#) "Variadic Templates: Wording for Core Issues 778, 1182, and 1183" to the C++0X Working Paper.

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
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In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 7

Move we apply [N3271](#) "Wording for Range-Based For Loop (Option #5)" to the C++0X Working Paper.

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 8

Move we apply [N3272](#) "Follow-up on override control" to the C++0X Working Paper.

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 9

Move we apply [N3276](#) "US22/DE9 Revisited: Decltype and Call Expressions" to the C++0X Working Paper.

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 10

Move we apply [N3277](#) "Core issues 1194/1195/1199: References and constexpr" to the C++0X Working Paper.

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 11

Move we apply [N3281](#) "Partial ordering of variadic class template partial specializations" to the C++0X Working Paper (covers core issue 692).

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 12

Move we apply [N3282](#) "Type of class member in trailing-return-type/Member access transformation in unevaluated operands" to the C++0X Working Paper (covers core issues 1017 and 1207).

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 13

Move we apply [N3283](#) "Dependent Bases and the Current Instantiation: Wording for Core Issue 1043" to the C++0X Working Paper.

Moved by: Adamczyk.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Library Motions

Motion 1

Move we apply the resolutions to the following Ready issues from [N3245](#) to the C++0X Working Paper:

[1332](#), [1385](#), [1408](#), [1418](#), [1420](#), [1438](#)

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
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In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Note that these issues address NB comments CH-1, GB-88, GB-99, GB-103, GB-113, GB-115, US-2, and US-126.

Motion 2

Move we apply the resolutions to the following Tentatively Ready issues from [N3245](#) to the C++0X Working Paper:

[1215](#), [1253](#), [1310](#), [1474](#), [1478](#), [1479](#), [1480](#), [1494](#), [1497](#), [1514](#), [1524](#)

Note that these issues address NB comments CH-1, CH-23, CH-30, US-2, GB-135, GB-137, US-165, US-175, US-179, US-190, and US-207.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 3

Move we apply the resolutions to the following Tentatively Ready issues from [N3245](#) to the C++0X Working Paper:

[2000](#), [2001](#), [2004](#), [2007](#), [2008](#), [2014](#), [2017](#), [2019](#), [2020](#), [2022](#), [2027](#), [2029](#), [2030](#), [2031](#), [2032](#)

Note that these issues address defects discovered since the FCD went out to ballot, and do not relate to any specific NB comment.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 4

Move we apply the resolutions to the following issues, resolved this meeting, from [N3284](#) to the C++0X Working Paper:

[1252](#), [1279](#), [1349](#), [1401](#), [1448](#), [1487](#), [1525](#)

Note that these issues address NB comments CH-1, CH-25, GB-65, GB-99, GB-117, GB-124, GB-136, US-2, and US-34.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 5

Move we apply the resolutions to the following issues, resolved this meeting, from [N3284](#) to the C++0X Working Paper:

[2041](#), [2042](#)

Note that these issues address defects discovered since the FCD went out to ballot, and do not relate to any specific NB comment.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 6

Move we apply the proposed resolution from [N3264](#), CH-18 and US-85: Clarifying the state of moved-from objects, to the C++0X Working Paper.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 7

Move we apply the proposed resolution from [N3266](#), Proposed Resolution for CH 15: Double check copy and move semantics of classes due to new rules for default move constructors and assignment operators, to the C++0X Working Paper.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 8

Move we apply the proposed resolution from [N3279](#), Conservative use of noexcept in the library, to the C++0X Working Paper.

Note that this reverts many applications of 'noexcept' at the last meeting. A 'Throws: Nothing' clause was restored only in the cases where that guarantee was in the pre-noexcept wording. This means some function contracts may have changed since the previous WP, such as `std::align`, by reverting to the contract in the FCD. This is only because there are no ballot comments requesting such changes, and 'Throws : Nothing' clauses are likely additions to the next TC.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8

Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 9

Move we apply the proposed resolution from [N3263](#) More on noexcept for the Containers Library, to the C++0X Working Paper.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 10

Move we apply the proposed resolution from [N3280](#), C++ Freestanding and Conditionally Supported, to the C++0X Working Paper.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 11

Move we apply the proposed resolution from [N3288](#), Compatibility with previous standard.

Moved by: Meredith.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Concurrency Motions

Motion 1

Move we apply [N3278 Recent Concurrency Issue Resolutions](#).

This paper includes resolutions for library issues 964, 1364, 1457, 1460, 1502, 1507, 1515, 1526, 2023, 2024, 2025, 2034 and 2037. These changes address CH 1, US 2, CH 19, GB 130, US 154, US195, US 196, US 197, US 199, US 208, and GB 111.

This paper includes editorial changes for closed core working group issues 1176 and 1177. These changes address C1x compatibility.

Moved by: Crowl.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Motion 2

Move we apply paper [N3251 noexcept for the Atomics Library](#). This paper addresses CH 16 and GB 60.

Moved by: Crowl.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0

Abstain:	0	Abstain:	0
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Motion 3

Move we apply paper [N3267 - A review of noexcept in the threads library \(revised\)](#). This paper addresses CH 16 and GB 60.

Moved by: Crowl.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	23	In favor:	8
Opposed:	0	Opposed:	0
Abstain:	0	Abstain:	0

Other Motions

Motion 1

Move we appoint a review committee consisting of Steve Adamczyk and Alisdair Meredith to approve the Project Editor's updated Working Paper amended by the foregoing motions, and request the Convener to forward the approved Working Paper to ITTF for Final Draft International Standard (FDIS) Ballot.

Moved by: Sutter.

Seconded by: Hedquist.

PL22.16		WG21	
In favor:	21	In favor:	8
Opposed:	2	Opposed:	0
Abstain:	0	Abstain:	0

Additional Motions

Nelson moved to thank the host. Halpern seconded. Applause ensued.

Clamage thanked Telefónica I+D for subsidizing the meals.

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

Clamage noted that there were no items for discussion.

11.3 Issues delayed until today.

Clamage reported that there were no issues delayed until today.

12. Plans for the future

12.1 Next and following meetings

Sutter presented the meeting schedule for upcoming meetings:

- August 15-19, 2011: Bloomington, Indiana, USA – Sponsored by University of Indiana
- March 2012 (estimated): Kona, Hawaii, USA – Sponsored by Plum Hall and Bloomberg
- September 2012 (estimated): Portland, Oregon, USA – Sponsored by Intel

Sutter noted that for these meetings we will revert to the 5-day rather than 6-day schedule.

Sutter noted that these meetings would be collocated with WG14 meetings.

Joly noted that usually there had been at least one meeting per year in Europe.

Sutter said that that was the tradition - not only in Europe, but also in other places outside of North America. He said he considered Kona to be not in North America, while being in the United States. For 2013, he noted, he was expecting at least one meeting to be in Europe.

Nelson noted that the dates for the September meeting are currently estimated to overlap with Rosh Hashanah and Yom Kippur, and that he wanted to ensure this was not an issue for anyone.

T. Plauger said that Brown was very upset last time when this happened.

Sutter responded that he had tried to avoid such overlap.

Nelson stated that he would personally contact Brown to see if he can make it nonetheless.

Crowl noted that there were some continents the group had not met on, and that he would be looking to Sutter to make that happen.

Sutter asked for a show of hands of those definitely or tentatively planning to attend the Bloomington meeting. Many attendees raised their hands.

Sutter noted that, as the group looked back on recent events, it was worth considering what they could improve in the future. He asserted that there were two major approaches: first, conservatism/orthodoxy, requiring existing practice before standardization, and second, legislative activism, considering that implementers may not implement until something is in a standard or draft.

Sutter stated that ISO rules are focused around consensus, rather than the actual decisions.

Sutter said he believed neither side would always get consensus, and that he felt the group should embrace that they had both of these side. As such, he noted, he was considering whether there was an even better way to balance these two viewpoints.

P.J. Plauger noted that there was another dimension to this, which was that at some point software would stop innovating, and that the group did not freeze soon enough.

Sutter said that one thing the group had learned from C++0x was that the highest-quality, lowest-risk parts of C++0x were parts standardized in TR1. He noted that one reason was that TR1 encouraged implementation before final standardization, in part by getting to an official published ISO document sooner.

Sutter said that TR1 also gave the group freedom, to further refine the design, make breaking changes as necessary, not adopt a feature, or place subsets into their own standards. He postulated that it may be impossible for special math functions to have been standardized at all if it did not go into a TR first.

Sutter said that the lesson taken from this was that when the group first shipped a TR, rearranging things was easy, and shipping a TR was much easier than an International Standard, because people were not as afraid about future breakage.

Sutter added that in the last process, the group did a library TR and then proposed a larger set of features for C++0x. He said that there was a possibility, as early as Bloomington, to provide a library TR and language TR (separately or together). He would recommend to include fixes we would do through the DR process as a TC in such TRs as well, and to do an extension TR instead of a CD. He noted that this may require an extra round of balloting, and that he suspected the group could move at least as fast as in this round. He explained that the group wouldn't have a lot of the discussions around implementation if they aimed for a TR, and that if the roadmap for the next standard were to do a TR instead of a CD, then the group could potentially ship the next standard very quickly after. For example, he suggested, on the same schedule as the time after CD in this round, the group could have a new standard within two years after the TR. He finished by stating that this was in fact the technique ISO would like the group to use for more experimental work.

Meredith said that from a library perspective, he would like to think of library implications around language changes and push something out together.

Sutter stated that the group could have more than one language TR as well, for example, a separate TR for concepts if that were looked at again – that decision could be deferred.

Kruegler asked how the sub-namespace would be named. Sutter said that he had no idea.

Crowl noted that a lot of driving in the core language in the first part was library implementers who said “this would be a whole lot easier if the language did X”. He asked how this supported that.

Sutter said that with separate TRs, a language TR could still contain library extensions.

Spicer said that he would much rather have this discussion after the Standard has shipped.

Stroustrup said that he saw how the group could build out libraries, has lots of ideas and that there's lots of opportunity for experimentation. He stated that his personal opinion was that language TRs would be harder, because they were less isolated. So,

he concluded, he needed more time to think as to whether he understood what would be meant by a “language TR”.

Stroustrup added stating a few things he would have said in Bloomington. He suggested that, if the group was going to mess with language features, it not fiddle with details. He asked the group to instead try and do it for things that actually make a difference for users, adding that he didn’t particularly want another for-loop and instead would like to think about whether the group could do reflection, distributed computing, concepts, etc. He noted that one example that he would think about was proposing open multimethods, and encouraged the group to look at his publications for these, where they would find papers, references to the implementation, timing results, etc. He noted that it had link up implications but would mean no more visitor patterns. He explained that that was the smallest he’d like to think about for language TRs – and asked the group not to think about many smaller features instead.

Sutter said that whether the group did this as a TR or a normal CD, there was one thing that would help in other language extensions. He explained that one difficulty was having to be a compiler vendor to experiment with them, and that the only open source compiler that has existed for C++ was GCC, which he believed to be pretty hard to extend. He said that he was encouraged by seeing someone having done an implementation of concepts in Clang with no time.

Gregor noted that there were lots of compilers out there, and there was no reason an expert in C++ could not experiment.

12.2 Mailings

Nelson reviewed the following mailing deadlines:

- Post-Madrid: April 8, 2011
- Pre-Bloomington: July 8, 2011

Crowl asked what topics were in scope for those mailings. Sutter answered that the group would not publish any N-numbered papers that mention the FDIS document until the FDIS ballot is complete.

Hinnant asked what the case would be for, say, a library facility that built on top of existing facilities – not changing it but interoperating with it. Sutter answered that he did not want to see a paper that proposed changes to our working paper.

Hinnant asked whether something targeting TR2 would be OK. Sutter confirmed that it would be.

Joly asked if the group was now in a phase where, if something totally new is proposed, it would be considered at the next meeting?

Sutter said that what was definitely on the agenda for next meeting was DR processing, FDIS ballot comments, etc. He said he had no sense from this room as to whether people would be in a mood to discuss new things or not. He suggested that anyone who's writing a paper proposing a feature should look around the room today.

Joly asked whether there would be an Evolution Working Group at the next meeting. Stroustrup answered that he preferred not to answer that question at this time, but that he was not saying no yet.

Meredith stated that, as LWG chair, his plan would be to freeze the issues list this weekend, and that he would expect not to have an issues list in the July mailing. He asked if anyone objected.

Sutter stated that there should be no N-numbered papers, including issues lists, which propose changes to the working papers, and that therefore no new issues lists should be published, though they could of course be maintained unofficially.

Miller asked whether Sutter had a feeling of the timescale for the FDIS ballot.

Sutter explained that the FDIS ballot was only two months, but that it might take some time to issue it. He said he was working very hard to minimize that time, but if the ballot was not complete before the pre-Bloomington mailing, no new issues lists or other proposed changes should be published. He said that members could still discuss, but could not vote.

Meredith asked whether an issues list should be published in the post-meeting mailing for this meeting. Sutter answered that he would prefer not to publish it, since he did not want any confusion around NBs thinking there are still some changes being made. He said he wanted to be very clear that we are taking a snapshot today, and it will not change until ballot process is done.

Some more discussions around this topic ensued.

Plum stated that his personal opinion was that the only function of an issues list for the next several months should be the directions given to the editor.

Sutter said that that was a reasonable characterization of what ISO wanted.

Hedquist said it was important to start following that rule now rather than waiting for the ballot to begin.

Vollman asked if the group should thus not include proposed wording against the FDIS in papers. Sutter answered that, yes, there should be no discussion of changes to the FDIS.

Sutter clarified that one could refer to the FDIS, but should not propose changes.

Crowl asked if the takeaway was no N-numbered documents. Sutter confirmed this.

Hinnant provided a suggestion for the working group chairs with regards to the issues list – he did not recommend that we remove Ready issues for Bloomington and then publish – instead, he recommended that issues lists be maintained separately and just not published as N numbers.

Meredith said that N-numbered document voted on included some parts that should not be included.

Hedquist noted that those documents needed to be published as a response to NB comments.

Sutter stated that the way to resolve that was to ensure the change lists get published before the FDIS.

Miller stated that it was really important to publish an issues list that has all of the things that the group had that were Open issues that are now reflected in the FDIS.

Sutter asked the group to please just make sure that it predated – and ideally had a lower N number – than the FDIS document.

Becker stated that as a practical matter, he wanted to make sure that all of the documents he needed were available. He assumed that the things voted on in the meeting were fair game for the post-meeting mailing.

Dawes noted that talking about administrivia was best handled by officers and committee chairs, and that the group was wasting time hashing this out in full committee.

Some more discussion ensued.

Halpern moved to thank the working group chairs: Steve Adamczyk, Alisdair Meredith, Lawrence Crowl. Du Toit seconded. Applause ensued.

Sutter stated that Becker had done a great deal of work, and unfortunately was outgoing. He moved to thank Becker for his work. Applause and a standing ovation ensued.

13. Adjournment

Clamage asked whether there was any other business. There was no other business.

Crowl moved to adjourn. Nelson seconded.

The meeting was adjourned at 18:03 (UTC+1) on Friday, March 25, 2011.

Attendance

Company/Organization	NB	Representative	Mon	Tue	Wed	Thu	Fri	Sat
Apple		Howard E. Hinnant	V	V	V	V	V	
Apple		Doug Gregor	A	A	A	A	A	
Bloomberg		John Lakos	V	V	V	V	V	
Bloomberg		Alisdair Meredith	A	A	A	A	A	
Bloomberg		Dietmar Kühl	A	A	A	A	A	
BoostPro Computing		Mat Marcus	V	V	V	V	V	
Carnegie Mellon University		David Svoboda	V	V	V	V	V	
Cisco Systems		Martin Sebor	V		V	V	V	
Dinkumware		P. J. Plauger	V	V	V	V	V	
Dinkumware		Tana Plauger	A	A	A	A	A	
Dinkumware		Christopher Walker	A	A		A		
DRW Holdings		Nevin Liber	V	V	V	V	V	
Edison Design Group		J. Stephen Adamczyk	V	V	V	V	V	
Edison Design Group		Jens Maurer	A	A	A	A	A	
Edison Design Group		William M. Miller	A	A	A	A	A	
Edison Design Group		John H. Spicer	A	A	A	A	A	
Edison Design Group		Daveed Vandevoorde	A	A	A	A	A	
Fujitsu Laboratories of America		Maarten Wiggers	A	A	A	A	A	
Gimpel Software		James Widman	V	V	V	V	V	
Google		Lawrence Crowl	V	V	V	V	V	
Google		James Dennett	A	A	A	A	A	
Google	NL	JC van Winkel	A	A	A	A	A	
Hewlett-Packard		Hans Boehm		V	V	V	V	
IBM	CA	Michael Wong	V	V	V	V	V	
Indiana University		Jeremiah Willcock	V	V	V	V	V	
Indiana University		Larisse Voufo	A	A	A		A	

Company/Organization	NB	Representative	Mon	Tue	Wed	Thu	Fri	Sat
Intel		Clark Nelson	V	V	V	V	V	
Intel		Pablo Halpern	A	A	A	A	A	
Intel	CA	Stefanus Du Toit	A	A	A	A	A	
Microsoft		Mark Hall	V	V	V	V	V	
Microsoft		Herb Sutter	A	A	A	A	A	
Oracle		Paolo Carlini	V	V	V	V		
Oracle		Stephen D. Clamage	A	A	A	A	A	
Perennial	US	Barry Hedquist	V	V	V	V	V	
Plum Hall		Thomas Plum	V	V	V	V	V	
Programming Research Group		Richard Corden	A	A	A	A	A	
Programming Research Group		Christof Meerwald	A	A	A	A	A	
Red Hat		Jason Merrill	V	V	V	V	V	
Red Hat		Benjamin Kosnik	A	A	A	A		
Riverbed Technology		Kyle Kloepper	V	V	V	V	V	
Roundhouse Consulting		Pete Becker	V	V	V	V	V	
Seymour		Bill Seymour	V	V	V	V	V	
Symantec		Mike Spertus	V	V	V			
Texas A&M University		Bjarne Stroustrup	A	A	A	A	A	
Texas A&M University		Jaakko Järvi	V	V	V	V	V	
PL22.16 Non-members								
BBVA	ES	Juan J Garcia De Soria				N		
BBVA	ES	Juan Morales				N		
Boost.org		Beman Dawes	N	N	N	N	N	
Bruker Daltonics	DE	Daniel Krügler	N	N	N	N	N	
Cambridge Univrsity		Mark Batty	N	N	N			
HSR	CH	Peter Sommerlad	N	N	N	N		
Tool, S.A.	ES	Victor Merino				N		
University of Bergen, BLDL	NO	Magne Haveraaen				N	N	
University Carlos III	ES	J. Daniel Garcia	N	N	N		N	

Company/Organization	NB	Representative	Mon	Tue	Wed	Thu	Fri	Sat
University of Nice	FR	Jean-Paul Rigault	N	N	N	N	N	
Vollmann Engineering	CH	Detlef Vollmann	N	N	N	N	N	
	DE	Nicolai Josuttis	N	N	N	N		
	ES	Francisco Palomo-Lozano	N	N	N	N		
	ES	Joaquín M López Muñoz	N					
	FI	Ville Voutilainen	N	N	N	N	N	
	FR	Loïc Joly	N	N	N		N	
	UK	Roger Orr	N	N	N	N	N	
		Faisal Vali	N	N	N	N	N	