

# WG21 2017-11 Albuquerque Minutes

ISO/IEC JTC1 SC22 WG21 N4709 – 2017-11-26

Jonathan Wakely, cxx@kayari.org

November 6 - 12, 2017 - Albuquerque, NM, USA

Chair: John Spicer

## 1. Opening activities (Monday 9:00)

### 1.1 Opening comments, welcome from host

Spicer thanked Nelson for serving as the previous chair.

Edwards welcomed everyone to Albuquerque. Explained the location of the sign-in sheet and paper sign-up sheet.

### 1.2 Meeting guidelines

Every participant is responsible for understanding and abiding by the [INCITS Antitrust Guidelines](#) and [Patent Policy](#) and the [ISO Code of Conduct](#).

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

The chair requested that prospective PL22.16 members inform the chair (Spicer) or vice-chair (Finkel) that they are present.

### 1.4 Introductions

Representatives from the following countries:

Bulgaria, Canada, Finland, France, Germany, Russia, Spain, Switzerland, UK, US, Poland (O)

### 1.5 Agenda review and approval

Agenda is in a revision of N4693, posted on the wiki.

Clow moved to adopt the agenda, Hedquist seconded.

Approved by unanimous consent (for both WG21 and .16 polls).

### 1.6 Editor's reports, approval of working drafts

Document	Editor's report	Prospective WD
C++20 Standard	N4701	N4700
Modules TS	N4682	N4681
Coroutines TS	N4679	N4680
Ranges TS	N4686	N4685
Networking TS	None	None
Parallelism TS	N4699	N4698

Tong pointed out that N4681 was already adopted in July.

An objection to approval of N4700 due to the removal of too many features. This is a new objection, not raised in Toronto.

Adoption of N4681, N4680, N4685 and N4698 approved by unanimous consent.

Favor	Opposed	Abstain
44	2	0

Adoption of N4700 is approved.

## 1.7 Approval of the minutes of the previous meetings

Meeting	Minutes
WG21 Toronto	N4691
PL22.16 Toronto	N4692
WG21 pre-Albuquerque administrative telecon	N4705

Ballman moved to accept the PL22.16 Toronto minutes, Hedquist seconded. Approved by unanimous consent.

WG21 minutes approved by unanimous consent.

## 2. Liaison reports, and WG21 study group reports

See pre-meeting WG21 telecon minutes.

## 3. WG progress reports and work plans for the week (Core, Evolution, Library, Library Evolution)

See pre-meeting WG21 telecon minutes.

## 4. New business requiring action by the committee

No new business.

## **5. Organize working groups and study groups, establish working procedures**

## **6. WG and SG sessions**

The WG and SG chairs must arrange for any proposals to be written up in the form of a motion, and made available by 8:00 PM Friday.

## **7. Review of the meeting (Saturday 8:30 AM)**

WG and SG status and progress reports. Presentation and discussion of proposals to be considered for consensus adoption by full WG21.

### **Evolution (Voutilainen)**

**SG5: Transactional memory (Wong)**

**SG6: Numerics (Crowl)**

**SG7: Reflection (Carruth)**

**SG10: Feature test (Nelson)**

**SG12: Undefined and unspecified behavior (Dos Reis)**

**SG14: Games & low latency (Wong)**

**SG1: Concurrency (Boehm)**

**Library Evolution (Yasskin)**

**Core (Miller)**

### **CWG Motions**

#### **Motion 1**

Move to accept as a Defect Report the issue in P0817R0 (Core Language "ready" issues) and apply its proposed resolutions to the C++ working paper.

Approved by unanimous consent.

#### **Motion 2**

Move to accept as Defect Reports the issues in P0818R1 (Core Language "tentatively ready" issues) and apply their proposed resolutions to the C++ working paper.

Approved by unanimous consent.

### **Motion 3**

Move to apply the changes in P0614R1 (Range-based for statements with initializer) to the C++ working paper.

Approved by unanimous consent.

### **Motion 4**

Move to accept the changes in P0588R1 (Simplifying implicit lambda capture) as a Defect Report and apply them to the C++ working paper.

Approved by unanimous consent.

### **Motion 5**

Move to apply the changes in P0846R0 (ADL and Function Templates that are not Visible) to the C++ working paper.

Approved by unanimous consent.

### **Motion 6**

Move to apply the changes in P0641R2 (Resolving Core Issue #1331 (const mismatch with defaulted copy constructor)) to the C++ working paper.

Approved by unanimous consent.

### **Motion 7**

Move to accept the changes in P0859R0 (Core Issue 1581: When are constexpr member functions defined?) as a Defect Report and apply them to the C++ working paper.

Approved by unanimous consent.

### **Motion 8**

Move to apply the changes in P0515R3 (Consistent comparison) and P0768R1 (Library Support for the Spaceship (Comparison) Operator) to the C++ working paper.

Approved by unanimous consent.

### **Motion 9**

Move to apply the changes in P0857R0 (Wording for "functionality gaps in constraints") to the C++

working paper.

Approved by unanimous consent.

**Motion 10**

Move to apply the changes in P0692R1 (Access Checking on Specializations) to the C++ working paper.

Approved by unanimous consent.

**Motion 11**

Move to apply the changes in P0624R2 (Default constructible and assignable stateless lambdas) to the C++ working paper.

Approved by unanimous consent.

**Motion 12**

Move to apply the changes in P0767R1 (Deprecate POD) to the C++ working paper.

Favor	Opposed	Abstain
36	2	4

Motion passed.

**Motion 13**

Move to apply the changes in P0315R4 (Wording for lambdas in unevaluated contexts) to the C++ working paper.

Approved by unanimous consent.

**Library (Clow)**

**LWG Motions**

**Parallelism TS**

**Motion 1**

Move that we apply the changes in P0776R1 (Rebase the Parallelism TS onto the C++17 Standard) to the Parallelism TS 2 working paper.

Approved by unanimous consent.

**Motion 2**

Move that we apply the changes in P0075R2 (Template Library for Parallel For Loops) to the Parallelism TS 2 working paper.

Approved by unanimous consent.

## **Networking TS**

### **Motion 3**

Move to apply the proposed resolution of LWG issue 2779 in P0815R0 (C++ Standard Library Issues to be moved in Albuquerque) to the Networking TS working paper.

Approved by unanimous consent.

C++

### **Motion 4**

Move to apply the proposed resolutions of all of the issues except LWG issue 2779 in P0815R0 (C++ Standard Library Issues to be moved in Albuquerque) to the C++ working paper.

Approved by unanimous consent.

### **Motion 5**

Move to apply the proposed resolution to LWG issue 2958 in P0864R0 (C++ Standard Library Issues Resolved Directly In Albuquerque) to the C++ working paper.

Approved by unanimous consent.

### **Motion 6**

Move that we apply the changes in P0550R2 (Transformation Trait `remove_cvref`) to the C++ working paper.

Approved by unanimous consent.

### **Motion 7**

Move that we apply the changes in P0777R1 (Treating Unnecessary decay) to the C++ working paper.

Approved by unanimous consent.

### **Motion 8**

Move that we apply the changes in P0600R1 (`nodiscard` in the Library) to the C++ working paper.

Approved by unanimous consent.

**Motion 9**

There is no Motion 9.

**Motion 10**

Move that we apply the changes in P0439R0 (Make `std::memory_order` a scoped enumeration) to the C++ working paper.

Approved by unanimous consent.

**Motion 11**

Move that we apply the changes in P0053R7 (C++ Synchronized Buffered Ostream) to the C++ working paper.

Approved by unanimous consent.

**Motion 12**

Move that we apply the changes in P0653R2 (Utility to convert a pointer to a raw pointer) to the C++ working paper.

Approved by unanimous consent.

**Motion 13**

Move that we apply the changes in P0202R3 (Add `constexpr` modifiers to functions in `<algorithm>` and `<utility>` Headers) to the C++ working paper.

Approved by unanimous consent.

**Motion 14**

Move that we apply the changes in P0415R1 (`constexpr` for `std::complex`) to the C++ working paper.

Approved by unanimous consent.

**Motion 15**

Move that we apply the changes in P0718R2 (Atomic `shared_ptr`) to the C++ working paper.

Favor	Opposed	Abstain
24	4	12

Motion passed.

**Motion 16**

Move that we apply the changes in P0020R6 (Floating Point Atomic) to the C++ working paper.

Approved by unanimous consent.

#### **Motion 17**

Move that we apply the changes in P0616R0 (de-pessimize legacy `<numeric>` algorithms with `std::move`) to the C++ working paper.

Approved by unanimous consent.

#### **Motion 18**

Move that we apply the changes in P0457R2 (String Prefix and Suffix Checking) to the C++ working paper.

Approved by unanimous consent.

#### **Editor's report**

Smith reported some non-trivial reorganization being done editorially, to resolve comments made on the C++17 draft by ISO. The proof of C++17 has been approved, so these changes will only be done to the C++20 working draft.

## **8. Closing activities**

Thanked the hosts.

Thanked the convener, the officers, the editor and editors, and chairs of subgroups and study groups, the scribes, the authors and reviewers, and the people who pay for our participation, and our loved ones who make do without us.

Josuttis thanked all the participants for a constructive meeting.

### **8.1 PL22.16 motions, if any**

None.

### **8.3 Issues delayed until today**

None.

## **10. Plans for the future (PL22.16)**

Sutter presented a proposed schedule for the C++20 IS, including moving forward the deadline for EWG to consider changes that would require the standard library to react.



Sutter asked if there was unanimous consent to accept the proposed schedule. Dennett suggested waiting because there hadn't been any time to consider it.

## 10.1 Next and following meetings

- 2018-07-03/12: Jacksonville, FL, US ([N4677](#))
- 2018-06-04/09: Rapperswil, CH ([N4673](#))

Other meetings not finalized.

## 10.2 Mailings

Upcoming mailing deadlines:

- 2017-11-27: Post-Albuquerque
- 2018-02-12: Pre-Jacksonville

Deadline for papers is 14:00 UTC.

There are plans to support self-service for automated paper number assignment.

## 11. Adjournment (11:30 AM)

Clow moved to adjourn, Hedquist seconded. Approved unanimously.

## 12. Attendance

The column "WG21" designates official PL22.16 or WG21 status ("P", "A", "E", "M")

The column "PL22.16" indicates organizations eligible to vote by "V", and advisory membership by "A".

### PL22.16 members

Company / Organization	NB	Representative	WG21	PL22.16
Amazon		Louis Dionne	P	V
Amazon		John McFarlane	A	
AMD		Siu Chi Chan	A	V
Apple		Duncan Exon Smith	A	V
Apple	CA	JF Bastien	A	
Apple		Tim Northover	A	
Apple		Bruno Cardoso Lopes	A	
Argonne National Lab		Hal Finkel	P	V
Bloomberg	UK	Alisdair Meredith	A	V

<b>Company / Organization</b>	<b>NB</b>	<b>Representative</b>	<b>WG21</b>	<b>PL22.16</b>
Bloomberg	UK	Dietmar Kühl	A	
Bloomberg		David Sankel	A	
Bloomberg		David Stone	A	
Bloomberg		Frank Birbacher		
Brown		Walter E. Brown	E	
Dinkumware		P.J. Plauger	P	V
Edison Design Group		John H. Spicer	P	V
Edison Design Group		Daveed Vandevoorde	A	
Edison Design Group		Jens Maurer	A	
Edison Design Group		Mike Herrick	A	
Edison Design Group		William M. Miller	A	
EPAM Systems Inc		Mateusz Pusz	P	V
Facebook		Eric Niebler	A	V
Facebook		Lee Howes	A	
Facebook		Nathan Sidwell		
FlightSafety International		Billy Baker	P	V
Google		Chandler Carruth	A	V
Google		Geoffrey Romer	A	
Google		James Dennett	A	
Google		Jeffrey Yasskin	A	
Google	UK	Richard Smith	A	
Google		Thomas Koeppe		
Google		Titus Winters	A	
Google		Chris Mysen		
Google		Tim Shen		
Google		Andrew Hunter		
Google		Matt Calabrese		
GrammaTech Inc,		Aaron Ballman	P	V
GreenWireSoft		Juan Alday	P	V
IBM		Paul E. McKenney	P	V
IBM	CA	Hubert Tong	A	
Intel		Clark Nelson	P	V
Intel		Pablo Halpern	A	
Intel		Erich Keane		
Lawrence Livermore		James Frederick Reus	P	V
Lawrence Livermore		Christopher Earl		
Lawrence Livermore		Tom Scogland		
Linden Research, Inc.		Nat Goodspeed	P	V
Los Alamos National Laboratory		Li-Ta Lo	P	V

<b>Company / Organization</b>	<b>NB</b>	<b>Representative</b>	<b>WG21</b>	<b>PL22.16</b>
Los Alamos National Laboratory		S. Davis Herring	A	
Los Alamos National Laboratory		Rachel Ertl	A	
Louisiana State University		Hartmut Kaiser	P	V
Louisiana State University		Agustin Berge	A	
LTK Engineering		Alan Talbot	P	V
Microsoft		Gabriel Dos Reis	A	V
Microsoft		Herb Sutter	A	
Microsoft		Stephan T. Lavavej	A	
Microsoft		Gor Nishanov	A	
Microsoft		Andrew Pardoe	A	
Microsoft		Casey Carter	A	
Microsoft		Andrew Marino	A	
MongoDB		Adam Martin	P	V
NVIDIA		Jared Hoberock	A	V
NVIDIA		Michael Garland	A	
NVIDIA		Olivier Giroux	A	
NVIDIA		Bryce Adelstein-Lelbach		
Oak Ridge National Laboratory		Graham Lopez	P	V
Ocient		Nevin Liber	P	
Perennial		Barry Hedquist	P	V
Perennial		Beman G. Dawes	A	
Plum Hall	FI	Ville Voutilainen	A	V
Programming Research Group		Christof Meerwald	A	V
Qualcomm		Marshall Clow	P	V
Red Hat	UK	Jonathan Wakely	A	V
Red Hat		Torvald Riegel	A	
Ripple Labs		Howard E. Hinnant	P	V
Ripple Labs		Scott Schurr	A	
Sandia National Labs		Carter Edwards	P	V
Sandia National Labs		David Hollman		
Sandia National Labs		Mark Hoemmen		
Sandia National Labs		Dan Sunderland		
Schonfeld Tools LLC		Wesley Maness	P	V
Seymour		Bill Seymour	P	V
Sony Computer Entertainment		Michael Spencer	A	V
Stellar Science		Kelly Walker	P	V
Stellar Science		Michael William Buksas	A	
Stellar Science		Daniel Davis	A	
Synopsys		Tom Honermann	A	

## Other WG21 members

Company / Organization	NB	Representative	WG21
BDS	BG	Vasil Vasilev	M
Codeplay	CA	Michael Wong	M
Mozilla	CA	Botond Ballo	M
University of Windsor	CA	Paul Preney	M
Vollmann Engineering	CH	Detlef Vollmann	M
HSR	CH	Peter Sommerlad	M
self	CH	Mauro Bianco	M
GSI	DE	Matthias Kretz	M
University Carlos III	ES	J. Daniel García	M
Yandex	RU	Aleksandr Fokin	M
self	UK	Dinka Ranns	M
PDT Partners	UK	Jeff Snyder	M
self	UK	Jonathan Coe	M
self	UK	Roger Orr	M
Jetbrains	UK	Timur Doumler	M
Nokia	PL	Michał Dominiak	

## Participating non-members

Company / Organization	NB	Representative
Jump Trading		Barry Revzin
National Instruments		Ben Craig
KEWB Computing		Bob Steagall
self		Faisal Vali
Blizzard		James Touton
University of Nice		Jean-Paul Rigault
Crystal Clear Software		Jeff Garland
Tanium		Lisa Lippincott
VMWare		Mark Zeren
self		Michael Park
Bob Taco Industries		Michael McLaughlin
self		Michael Young
self		Nicolai Josuttis
Roundhouse Consulting		Pete Becker
RKR Capital		Robert Douglas
Sabre		Tomasz Kamiński
ARM		Will Deacon

<b>Company / Organization</b>	<b>NB</b>	<b>Representative</b>
Cadence		Zach Laine
MJD Interactive		Brigham Toskin
QwidgetCo		Fred Moxley
DXC		Michael Scoggin
self		Nathan Myers