1. Opening activities

John Spicer opened the meeting at 9:05 CEST.

1.1 Opening comments, welcome from host

Marshall Clow welcomes the group and presents the information about the location of the meeting.
Thank you to Qualcomm.

John presents the schedule for the meeting. Working groups will meet until Friday. Plenary is scheduled for Saturday at 8:30 am CEST.

1.2 Meeting Guidelines

John presents.
Every participant is responsible for understanding and abiding by the following:
- The INCITS Antitrust Guidelines (PL22.16)
- The INCITS Patent Policy (PL22.16)
- The ISO Code of Conduct
- The WG21 Practices and Procedures, and Code of Conduct

Please review the guidelines. WG21 procedures and Code of Conduct documents are new and very important. We want to make sure that everybody interacts in a professional and respectful way.

If you have any questions talk to one of the officials.
1.3 Membership, voting rights, and procedures for the meeting

John Spicer reminds the room of the meeting procedures and voting rights.

Barry Hedquist presents. PL22.16 has the ballot process on Saturday. The Saturday vote is approval of Systematic Review for ISO/IEC TS 19217:2015 -- C++ Extensions for Concepts. If you are not here on Saturday, and you are a voting member, please send an email to John, Hal or Barry.

1.4 Introductions

Officers and WG chairs introduce themselves
First time attendees introduce themselves.
John Spicer welcomes first time attendees.

1.5 Agenda review and approval

John presents the agenda for the meeting. The meeting will finish no later than 2pm on Saturday, but WG may continue working.

Barry Hedquist moves. Adam Martin seconds.
The motion is unanimously approved by PL22/16.
The motion is unanimously approved by WG21.

1.6 Editor's reports, approval of working drafts

<table>
<thead>
<tr>
<th>Document</th>
<th>Editor's report</th>
<th>Prospective WD</th>
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<tbody>
<tr>
<td>C++20 Standard</td>
<td>N4779</td>
<td>N4778</td>
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<tr>
<td>Coroutines TS</td>
<td>N4776</td>
<td>N4775</td>
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<td>Parallelism v2 TS</td>
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Motion to approve editor’s reports and working drafts. The motion is unanimously approved by WG21.

1.7 Approval of the minutes of the previous meetings

<table>
<thead>
<tr>
<th>Meeting</th>
<th>Minutes</th>
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<tr>
<td>WG21 Rapperswil</td>
<td>N4781</td>
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<tr>
<td>PL22.16 Rapperswil</td>
<td>pl22.16-2018-0001</td>
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<tr>
<td>WG21 pre-San Diego administrative telecon</td>
<td>N4784</td>
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</table>

Motion to approve the minutes of the previous meeting. The motion is unanimously approved by WG21.

PL22/16 motion to approve the minutes of the previous meeting. Marshall Clow moves, Barry Hedquist seconds. The motion is unanimously approved by PL22/16. The motion is unanimously approved by WG21.

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

Herb presents new incubator groups and improved handling of papers.

Herb presents the WG21 groups.
Herb presents the meeting schedule.

4. Plans for the future (special Monday session to discuss Cologne)

Plans for the future (PL22.16)

1. Next and following meetings
   - 2019-07-15/20: Cologne, Germany (N4780)
   - 209-11-4/09 Belfast, Northern Ireland

Nico Josuttis presents details of the Cologne meeting.

Jens Maurer presents details of the Kona meeting.

5. WG and SG sessions

John Spicer presents: during the week, CWG and LWG will be putting out proposal that will be voted on Saturday. Those need to be finalised and made available by 8pm CEST Friday.

Jens Maurer presents meeting room schedule. The schedule can be found on the wiki.
SG5 will meet after the plenary meeting. SG10 will meet during the week. See John Spicer.

Jens presents evening sessions.

Jens presents meeting times and the break times.

6. Review of the meeting (Saturday 8:30 AM)

John Spicer opened the meeting at 8:34am CEST.

Herb Sutter goes over the voting procedure. Thank you to Michael Wong for chairing SG5. Michael will be stepping down and Hans Boehm has volunteered to take over as chair of SG5.

There are two new study groups:
SG19: Machine Learning (Michael Wong)
SG20: Education (JC van Winkel).

WG and SG status and progress reports.

- **SG5: Transactional memory (Wong)**
  
  Michael Wong presents.

- **SG6: Numerics (Crowl)**
  
  Herb Sutter presents.

- **SG7: Compile-time programming (Carruth)**
  
  Chandler Carruth presents.

- **SG10: Feature test (Nelson)**
  
  John Spicer presents.

- **SG12: Undefined and unspecified behavior (Dos Reis)**
Herb reads out report by Gabriel Dos Reis.

- **SG13: HMI & I/O (Human/Machine Interface) (Roger Orr)**
  Roger Orr presents.

- **SG14: Games & low latency (Wong)**
  Michael Wong presents.

- **SG15: Tooling (Winters)**
  Bryce Adelstein Lelbach presents.

- **SG16: Unicode (Honermann)**
  Tom Honermann presents.

- **SG1: Concurrency (Giroux)**
  Olivier Giroux presents.

- **SG17: EWG Incubator (JF Bastien)**
  Erich Keane presents.

- **Evolution (Voutilainen)**
  Ville Voutilainen presents.

- **SG18: LEWG Incubator (Bryce Adelstein Lelbach)**
  Bryce Adelstein Lelbach presents.
Library Evolution (Winters)

Titus Winters presents.

Core (Miller)

Mike Miller presents.

CWG Motions

Motion 1
Move to accept as Defect Reports all issues in P1350R0 (Core Language Working Group "tentatively ready" Issues for the November, 2018 (San Diego) meeting) and apply the proposed resolutions to the C++ working paper.

No objections.
Motion passes.

Motion 2
Move to apply the changes in the "Consolidated wording" section of P0668R5 (Revising the C++ memory model) to the C++ working paper.

No objections.
Motion passes.

Motion 3
Move to apply the changes in P0982R1 (Weaken Release Sequences) to the C++ working paper.

No objections.
Motion passes.

Motion 4
Move to apply the changes in P1084R2 (Today's return-type-requirements Are Insufficient) to the C++ working paper.

No objections.
Motion passes.

Motion 5
Move to apply the changes in P1131R2 (Core Issue 2292: *simple-template-id* is ambiguous between *class-name* and *type-name*) to the C++ working paper.

No objections.  
Motion passes.

**Motion 6**  
Move to apply the changes in P1289R1 (Access control in contract conditions) to the C++ working paper.

No objections.  
Motion passes.

**Motion 7**  
Move to apply the changes in N4775 (Working Draft, C++ Extensions for Coroutines) as modified by the changes in P1356R0 (Coroutine TS ready issues (25 and 27)) to the C++ working paper.

There are objections in the room.

Herb polls the room  
In favour : 34  
Opposed : 17  
Abstain : 10

Herb polls national bodies:

- Bulgaria Opposed  
- Canada Opposed  
- Finland In favour  
- France In favour  
- Germany Opposed  
- Netherlands In favour  
- Poland Opposed  
- Russia In favour  
- Spain Abstain  
- Switzerland Opposed  
- UK Opposed  
- US In favour

Motion fails

Herb : NB approval has decreased.

**Motion 8**
Move to apply the changes in P1002R1 (Try-catch blocks in constexpr functions) to the C++ working paper.

No objections.
Motion passes.

**Motion 9**
Move to apply the changes in P1327R1 (Allowing `dynamic_cast`, polymorphic `typeid` in Constant Expressions) to the C++ working paper.

No objections.
Motion passes.

**Motion 10**
Move to apply the changes in P1236R1 (Alternative Wording for P0907R4 Signed Integers are Two's Complement) to the C++ working paper.

No objections.
Motion passes.

**Motion 11**
Move to apply the changes in P0482R6 (char8_t: A type for UTF-8 characters and strings (Revision 6)) to the C++ working paper.

There are objection in the room
In favour 37
Opposed : 1
Abstained : 17

Motion passes.

**Motion 12**
Move to apply the changes in P1353R0 (Missing Feature Test Macros) to the C++ working paper.

No objections.
Motion passes.

**Motion 13**
Move to apply the changes in P1073R3 (Immediate functions) to the C++ working paper.

No objections.
Motion passes.

**Motion 14**  
Move to apply the changes in P0595R2 (`std::is_constant_evaluated()`) to the C++ working paper.

No objections.  
Motion passes.

**Motion 15**  
Move to apply the changes in P1141R2 (Yet another approach for constrained declarations) to the C++ working paper.

No objections.  
Motion passes.

**Motion 16**  
Move to apply the changes in P1094R2 (Nested Inline Namespaces) to the C++ working paper.

No objections.  
Motion passes.

**Motion 17**  
Move to apply the changes in P1330R0 (Changing the active member of a union inside constexpr) to the C++ working paper.

No objections.  
Motion passes.

° **LWG (Clow)**

Marshal Clow presents.

**LWG Motions**

**Concurrency TS**  
**Motion 1**  
Move to apply to the Concurrency TS working paper the proposed resolution of issue 2697 in P1224R0 (C++ Standard Library Issues to be moved in San Diego).

No objections.
Motion passes.

**Library Fundamentals TS**

**Motion 2**
Move to apply to the Library Fundamentals TS working paper the proposed resolution of issues 2960 and 3134 in P1224R0 (C++ Standard Library Issues to be moved in San Diego).

No objections.  
Motion passes.

**Motion 3**
Move to apply to the Library Fundamentals TS working paper the proposed wording in P1210R0 (Completing the Rebase of Library Fundamentals, Version 3, Working Draft). This also resolves LWG issue 3134.

No objections.  
Motion passes.

**Issues**

**Motion 4**
Move to apply to the C++ working paper the proposed resolutions of all of the issues except 2697, 2960 and 3134 in P1224R0 (C++ Standard Library Issues to be moved in San Diego).

No objections.  
Motion passes.

**Draft Standard**

**Motion 5**
Move to apply to the C++ working paper the proposed wording in P1123R0 (Editorial Guidance for merging P0019r8 and P0528r3).

No objections.  
Motion passes.

**Motion 6**
Move to apply to the C++ working paper the proposed wording in P0487R1 (Fixing operator>>(basic_istream&, CharT*) (LWG 2499)).

No objections.  
Motion passes.
Motion 7
Move to apply to the C++ working paper the proposed wording in P0602R4 (variant and optional should propagate copy/move triviality).

No objections.
Motion passes.

Motion 8
Move to apply to the C++ working paper the proposed wording in P0655R1 (visit<R>: Explicit Return Type for visit).

No objections.
Motion passes.

Motion 9
Move to apply to the C++ working paper the proposed wording in P0972R0 (<chrono> zero(), min(), and max() should be noexcept).

No objections.
Motion passes.

Motion 10
Move to apply to the C++ working paper the proposed wording in P1006R1 (Constexpr in std::pointer_traits).

No objections.
Motion passes.

Motion 11
Move to apply to the C++ working paper the proposed wording in P1032R1 (Misc constexpr bits).

No objections.
Motion passes.

Motion 12
Move to apply to the C++ working paper the proposed wording in P1148R0 (Cleaning up Clause 20).

No objections.
Motion passes.
Motion 13
Move to apply to the C++ working paper the proposed wording in P0318R1 (unwrap_ref_decay and unwrap_reference)

No objections.
Motion passes.

Motion 14
Move to apply to the C++ working paper the proposed wording in P0357R3 (reference_wrapper for incomplete types)

No objections.
Motion passes.

Motion 15
Move to apply to the C++ working paper the proposed wording in P0608R3 (A sane variant converting constructor)

No objections.
Motion passes.

Motion 16
Move to apply to the C++ working paper the proposed wording in P0771R1 (std::function move constructor should be noexcept)

No objections.
Motion passes.

Motion 17
Move to apply to the C++ working paper the proposed wording in P1007R3 (std::assume_aligned)

No objections.
Motion passes.

Motion 18
Move to apply to the C++ working paper the proposed wording in P1020R1 (Smart pointer creation with default initialization)
No objections.
Motion passes.

**Motion 19**
Move to apply to the C++ working paper the proposed wording in P1285R0 (Improving Completeness Requirements for Type Traits)

No objections.
Motion passes.

**Motion 20**
Move to apply to the C++ working paper the proposed wording in P1248R1 (Remove CommonReference requirement from StrictWeak Ordering (a.k.a Fixing Relations))

No objections.
Motion passes.

**Motion 21**
Move to apply to the C++ working paper the proposed wording in P0591R4 (Utility functions to implement uses-allocator construction)

No objections.
Motion passes.

**Motion 22**
Move to apply to the C++ working paper the proposed wording in P0899R1 (LWG 3016 is Not a Defect)

No objections.
Motion passes.

**Motion 23**
Move to apply to the C++ working paper the proposed wording in P1085R2 (Should Span be Regular?)

There are objections in the room.
In favour : 30
Opposed : 1
Abstain : 25

Motion passes.
**Motion 24**
Move to apply to the C++ working paper the proposed wording in P1165R1 (Make stateful allocator propagation more consistent for `operator+(basic_string)`)

No objections.
Motion passes.

**Motion 25**
Move to apply to the C++ working paper the proposed wording in P0896R4 (The One Ranges Proposal)

No objections.
Motion passes.

**Motion 26**
Move to apply to the C++ working paper the proposed wording in P0356R5 (Simplified partial function application).

No objections.
Motion passes.

**Motion 27**
Move to apply to the C++ working paper the proposed wording in P0919R3 (Heterogeneous lookup for unordered containers).

There are objections in the room.
In favour: 26
Opposed: 2
Abstain: 25
Motion passes

**Motion 28**
Move to apply to the C++ working paper the proposed wording in P1209R0 (Adopt Consistent Container Erasure from Library Fundamentals 2 for C++20).

No objections.
Motion passes.

- Direction Group

Bjarne Stroustrup presents.
7. Closing activities

7.1 Issues delayed until today

7.2. PL22.16 motions, if any

John Spicer presents voting rules.


Barry Hedquist moves.
Marshall Clow seconds.
In favour : 26 in the room + 3 by e-mail
Opposed : 0
Abstain : 0

Motion passes

Thank you the host and the sponsors.
Thank you to everyone that participated and those who helped us participate.

7.3 Mailings

- 2018-11-26: Post-San Diego
- 2019-01-21: Pre-Kona

8. Adjournment

Approved by unanimous consent.
Spicer adjourns the meeting at 11:01 am CEST.

9. Attendance

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