# C++ Club UK

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2019-08-22

# Introducing the Rule of DesDeMovA (1/4)

Blog post by Peter Sommerlad

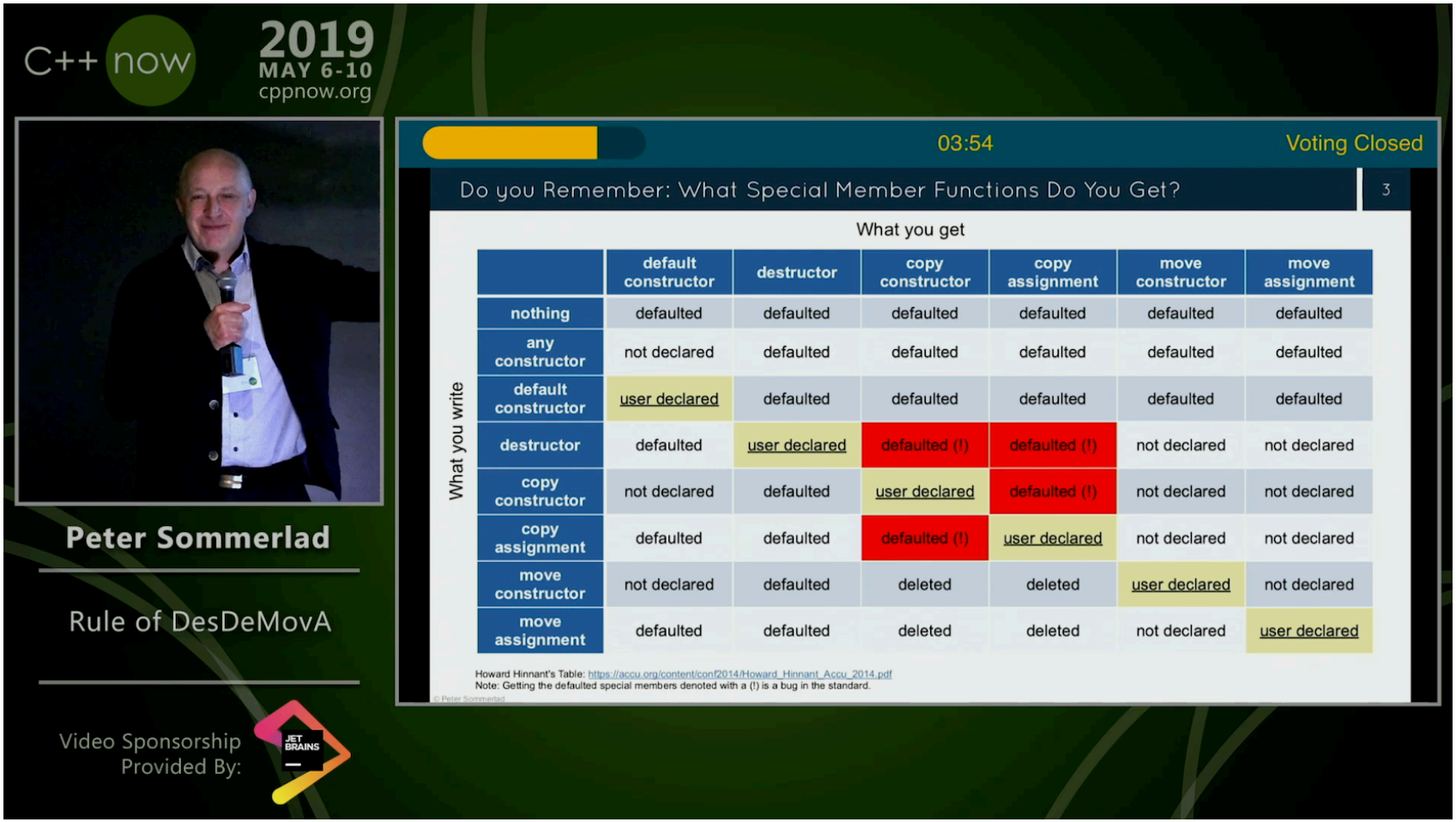
https://blog.safecpp.com/2019/07/01/initial.html

https://accu.org/content/conf2014/Howard_Hinnant_Accu_2014.pdf

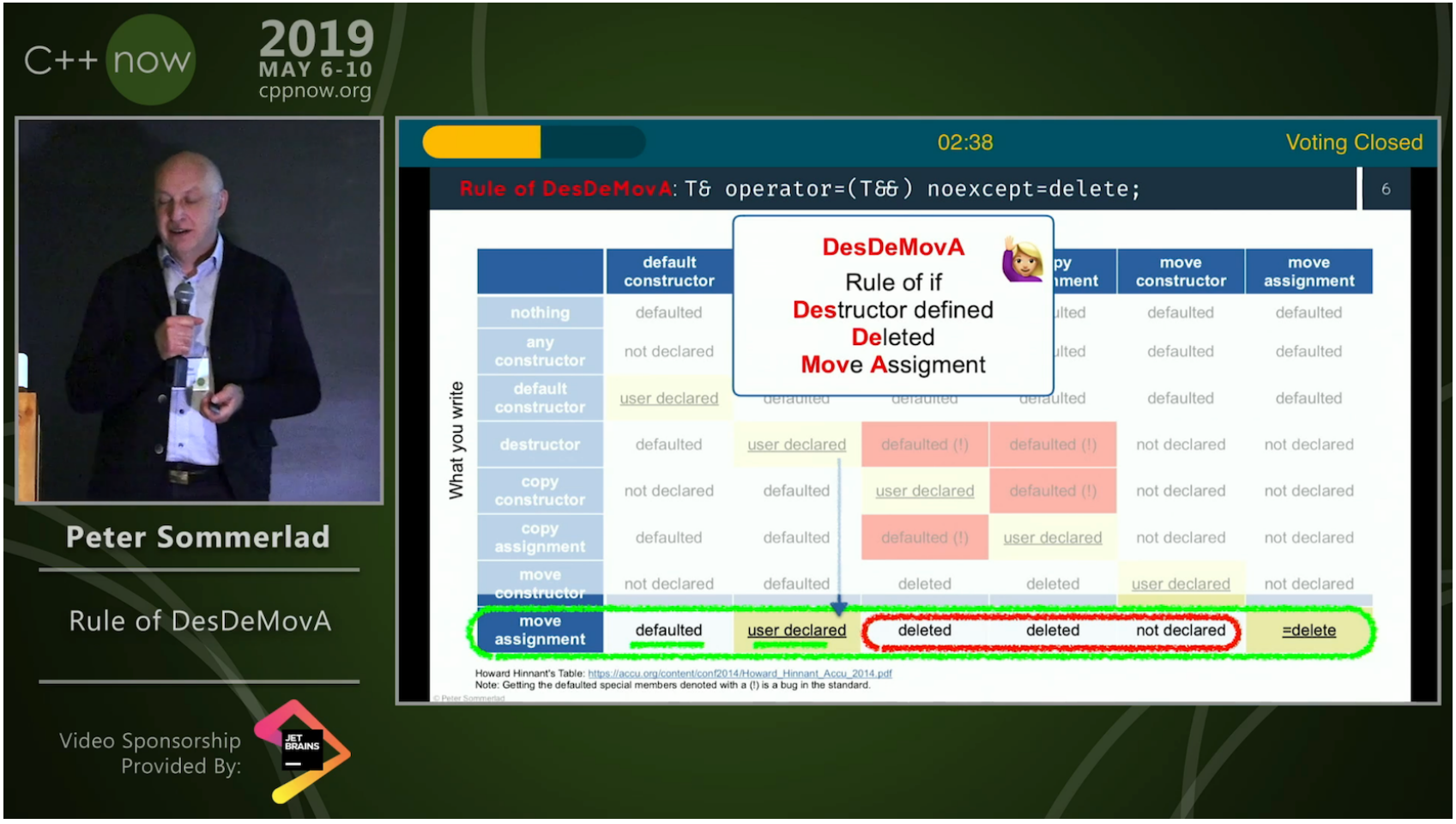
Rule of Zero:

> *Code that you do not write cannot be wrong.*

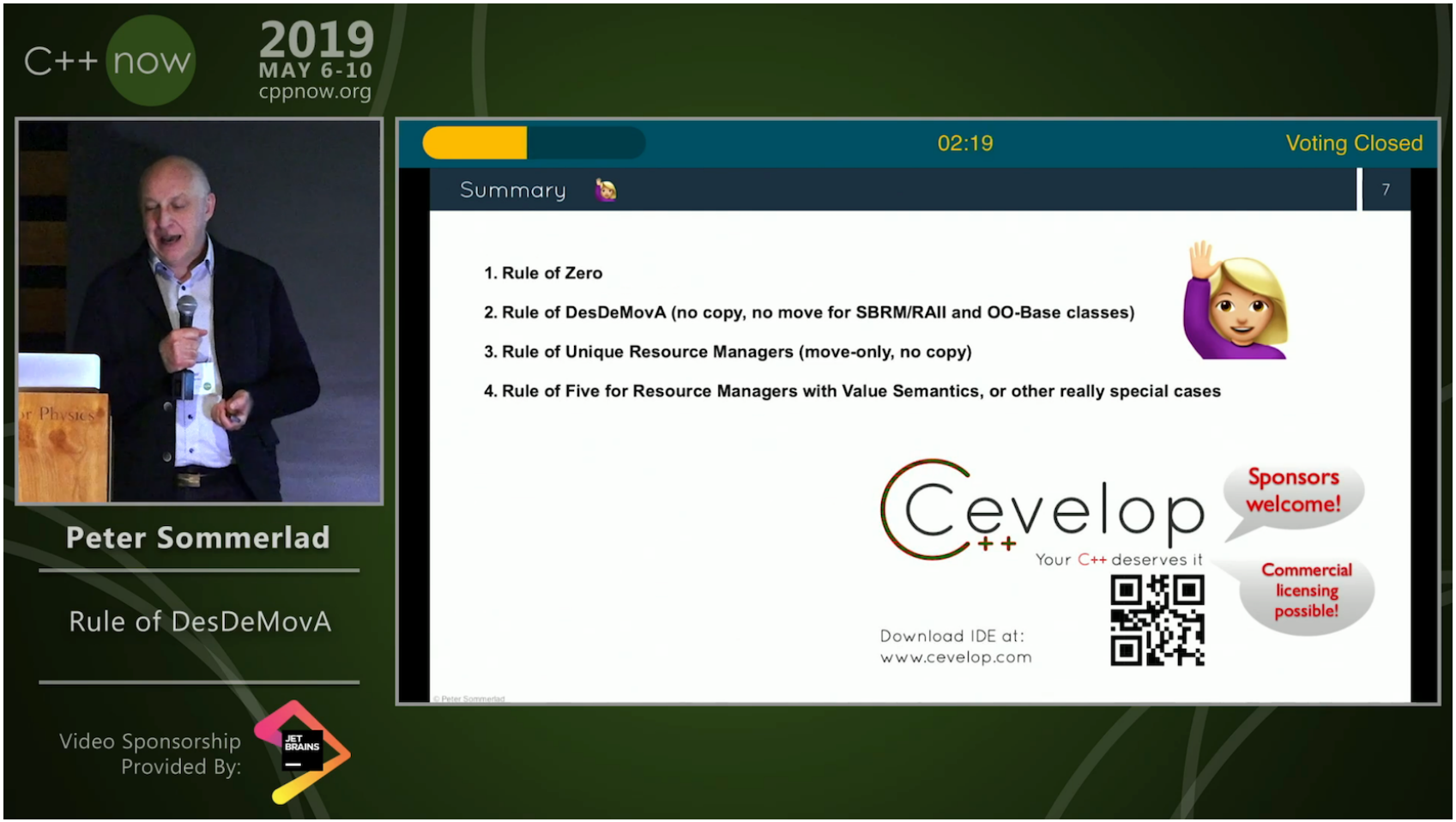
# Introducing the Rule of DesDeMovA (2/4)



# Introducing the Rule of DesDeMovA (3/4)



# Introducing the Rule of DesDeMovA (3/4)



# **strong_typedef** - Create distinct types for distinct purposes

Article by Anthony Williams

https://www.justsoftwaresolutions.co.uk/cplusplus/strong_typedef.html

https://github.com/anthonywilliams/strong_typedef

```
1 using transaction_id =
2   jss::strong_typedef<struct transaction_tag, std::string>;
3
4 bool is_a_foo(transaction_id id)
5 {
6   auto &s = id.underlying_value();
7   return s.find("foo") != s.end();
8 }
```

# Elements C++ GUI library

https://www.cycfi.com/2019/07/photon-micro-gui/

https://www.reddit.com/r/cpp/comments/ccq9pn/elemental_c_gui_library/

# C++ libraries for data visualization

- VTK https://vtk.org/
- ROOT https://root.cern.ch/
- matplotlib-cpp https://github.com/lava/matplotlib-cpp
  - matplotlib (Python) https://matplotlib.org/
- QCustomPlot (QT, GPL/commercial) https://www.qcustomplot.com/

# CppCast - CMake and VTK with Robert Maynard

http://cppcast.com/2019/07/robert-maynard/

https://www.reddit.com/r/cpp/comments/c9bpxb/cppcast_cmake_and_vtk_with_robert_maynard/

# CMake line by line - creating a header-only library

http://dominikberner.ch/cmake-interface-lib/

https://www.reddit.com/r/cpp/comments/c8ty2h/a_line_by_line_explanation_how_to_create_a/

https://github.com/bernedom/SI

Professional CMake: A Practical Guide, 4th ed., CMake 3.15
https://crascit.com/professional-cmake/ $30

# OSes built using C++

https://www.reddit.com/r/cpp/comments/cho1qb/are_there_any_oses_built_using_c/

- TempleOS
- Haiku
- Google Fuchsia
- IncludeOS
- DistortOS (RTOS)
- Symbian OS (Dead)
- SerenityOS

# Agner Vector Class Library V2

This is a C++17 class library for using the Single Instruction Multiple Data (SIMD) instructions in modern microprocessors.

https://www.agner.org/optimize/blog/read.php?i=1013

https://github.com/vectorclass/version2 (Apache 2.0)

Manual https://github.com/vectorclass/manual/blob/master/vcl_manual.pdf

# Approval tests (1/2)

Also known as **Golden Master Tests** or **Snapshot Testing** (locking down current behaviour)

- CppOnSea 2019 - Clare Macrae - Quickly testing legacy code https://youtu.be/dtm8V3TIB6k
  - Slides https://slideshare.net/ClareMacrae
  - CppCast with Clare Macrae https://cppcast.com/clare-macrae/
    - r/cpp https://www.reddit.com/r/cpp/comments/ckzc11/cppcast_approval_tests_with_clare_macrae/
- Code https://github.com/approvals/ApprovalTests.cpp (Apache 2.0)
- Approval Tests Library - Capturing Human Intelligence [available for Java, C#, VB.Net, PHP, Ruby, Node.JS and Python] https://approvaltests.com/ by Llevelyn Falco
  - Supports Catch, Catch 2, Google Test, Okra
- Mutation tests: sabotage the code
  - Mutate++ https://github.com/nlohmann/mutate_cpp

# Approval tests (2/2)

## Books

- Modern C++ Programming with Test-Driven Development, by Jeff Langr [Safari Books Online]
- Your Code as a Crime Scene, by Adam Tornhill [Safari Books Online]
- Software Design X-Rays, by Adam Tornhill [Safari Books Online]

## Tools

- OpenCoverage https://github.com/OpenCppCoverage
- BullseyeCoverage https://www.bullseye.com

# mdspan

- Implementation https://github.com/kokkos/mdspan (BSD 3-Clause)
  - Intro https://github.com/kokkos/mdspan/wiki/A-Gentle-Introduction-to-mdspan
  - r/cpp https://www.reddit.com/r/cpp/comments/cl127i/mdspan_productionquality_reference_implementation/
- Kokkos https://github.com/kokkos/kokkos
- Multi-dimensional strided array views in Magnum https://blog.magnum.graphics/backstage/multidimensional-strided-array-views/
- P0009R9 **mdspan**: A Non-Owning Multidimensional Array Reference http://wg21.link/p0009r9
- CppCast with Bryce Adelstein Lelbach https://cppcast.com/bryce-lelbach-mdspan/

**Tony Van Eerd** @tvaneerd

```
try {
  return vec.at(index);
}
catch (std::out_of_range const &) {
  return -1;
}
```

I just saw this in a code review and was going to claim it inefficient, but darn @CompileExplore proved me wrong again. (IIRAC*) All compilers turn it into an if check on the bounds.

*Read ASM

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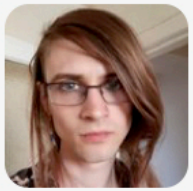
# Twitter: Neural Proposals



**Simon Brand** @TartanLlama

Threw every C++ proposal title in history into a recurrent neural network and some sound surprisingly legit

```
Introducing the Proposal for an Resumable memory related initialization from string_user enuming_values
Integer C++ Function (Revision 9)
Fixing The Konates of Capture
feature_lock_view-expressions
GENDA, Tiny Proposed Regrogish to Standard Library
Transparentic atomic operations (rev. 3)
Editor's Report for Deprecate Vector Technical Specification and Allocation
Containers for Parflock Points
std::function without a requirement and optimization for the C++2 Defects Record
Propose-a the Generic Memory Modification
Equalized Interaction for the Model Proposal for P0107R2
Introduce types in computing and string_that in C++
Contract Design Aliation for be Business
Gegropage initialization finesy policies in point memory scheduler be_roding_robot and enumerations
Reflection of noexcepts in C++20
std::::haluter_tokence_related (revision 1)
Meeting Not C++
Parallellative Intermate() and unlumbing_cip
What madened: Propose-tight member of Painfreacted Default
Lookup Asiomation TS
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