# C++ Club UK

Gleb Dolgich

2019-09-12

# C++20 Concepts Are Here in Visual Studio 2019 version 16.3

https://devblogs.microsoft.com/cppblog/c20-concepts-are-here-in-visual-studio-2019-version-16-3/

https://www.reddit.com/r/cpp/comments/d2alin/c20_concepts_in_visual_studio_2019_version_163/

# Dropbox abandons C++, uses Swift, Kotlin, JavaScript and Electron instead

- Eyal Guthmann (Dropbox): The (not so) hidden cost of sharing code between iOS and Android

  > *It's possible we could have done a better job at leveraging open source C++ libraries, but the open source culture in the C++ development community was (is still?) not as strong as it is in the mobile development community <...>*

- Reddit

- HackerNews

  > *It seems like the real issue was that Dropbox lost all of their senior C++ engineers.*

- The Register: Dropbox would rather write code twice than try to make C++ work on both iOS and Android

  - Reddit

# Dropbox abandons C++, uses Swift, Kotlin, JavaScript and Electron instead

Previously

- Djinni
- CppCon 2014: Alex Allain & Andrew Twyman ”Practical Cross-Platform Mobile C++ Development
- CppCon 2017: Stephen Spann “Cross-Platform Apps with Dropbox’s Djinni...”

# Unified function call

Barry Revzin

- What is unified function call syntax anyway?
  - Reddit
- UFCS Customization and Extension
  - Reddit
  - P1282R0 Ceci N'est Pas Une Pipe: Adding a workflow operator to C++

# Unified function call

Bjarne Stroustrup

## A bit of background for the unified call proposal

> *Based on real input from code and users, I reluctantly agreed that for compatibility reasons, x.f(y) and f(x,y) could not mean exactly the same. The only feasible way forward was to do a traditional lookup based on the syntax used, and then try the other syntax if the first one failed. Stability – backwards compatibility – is an important feature, overruling my desire for perfection.*

## P0131 Unified call syntax concerns

# 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

https://www.cleanqt.io/blog/crash-course-in-qt-for-c%2B%2B-developers,-part-1

# Modern Qt Development: The Top 10 Tools You Should Be Using

https://blog.qt.io/blog/2018/10/12/modern-qt-development-top-10-tools-using/
https:
//www.reddit.com/r/cpp/comments/9njw5n/is_there_an_easytouse_gui_library/

https://www.cleanqt.io/blog/cmake-it-modern-using-c%2B%2B-and-qt,-part-1

# A new SQLite C++ wrapper

https://blog.trailofbits.com/2019/08/26/wrappers-delight/

https://www.reddit.com/r/cpp/comments/cxxk4b/a_new_c_sqlite_wrapper/

The Reddit thread also includes a heated discussion on how to handle errors and if exceptions are a good thing (eyeroll).

# **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/

- Reddit

# 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/

- Reddit

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

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

- Reddit

https://github.com/bernedom/SI

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

# 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

# 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/

# Clang Build Analyzer

https://github.com/aras-p/ClangBuildAnalyzer

# Machine Learning with CPP

https://www.reddit.com/r/cpp/comments/cjrrwm/machine_learning_with_cpp/

- PyTorch https://pytorch.org/features -- has a pure C++ front end https://pytorch.org/cppdocs/
- TensorFlow for C++ https://www.tensorflow.org/api_docs/cc
- Shogun https://www.shogun.ml/

# The sad history of Unicode printf-style format specifiers in Visual C++

https://devblogs.microsoft.com/oldnewthing/20190830-00/?p=102823

https://www.reddit.com/r/cpp/comments/cxi2xy/the_sad_history_of_unicode_printfstyle_format/

**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

11h • 11/07/2019 • 22:56

# Twitter: Generic cup

**John McFarlane** @JSAMcFarlane

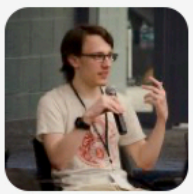
Accidentally accurate: apparently this mug is "generic".


Generic Cup<T> Two-Tone Coffe...

zazzle.com

9h • 12/08/2019 • 14:56

# Twitter: Electronics



**Remy Goldschmidt** @taktoa1

Electronics is like programming, except if you call a function with arguments of the wrong type, the function is deleted.

1d • 19/08/2019 • 01:38

# Twitter: CppCon Bingo

## cppcon bingo

| | | | | |
|---|---|---|---|---|
| Herb Sutter playing piano | Gripes about exceptions | Allocators | Monday WiFi issues | Unicode printing errors on badges |
| Memes on slides | Another hipster presentation uses reveal.js | Strategies for talking to C programmers | Attendees try to file feature requests in person | Template meta programming |
| Visual Studio demos | Zero cost abstractions | Boost | Concepts | Live coding demo crashes or doesn't compile |
| Bryce with a flock of volunteers following him | Assurances that X will be in the next standard | A lunch group grows way too big for any one restaurant | Java hate | Subtle bugs on concurrency slides |
| Last minute slide making | Cherry Coke | Monads | "JS/Swift/Rust has X, why doesn't C++?" | (Re)definition of modern C++ |