C++ Club UK Meeting 122

Gleb Dolgich

2021-02-18

Variants suck. But you can get good performance with esoteric tricks. And even if you don't use them well, they'll still be faster than virtual inheritance

- Reddit

Is Zero a Butterfly?

- Shafik Yaghmour
  - Reddit

std::optional and other useful types

- Reddit

EnTT 3.6.0

Gaming meets modern C++ - a fast and reliable entity component system (ECS) and much more.

- Announcement on Reddit
  - GitHub (C++17, MIT)

With std::variant, you choose either performance or sanity

- Reddit

MSVC build performance

- Improving code generation time with C++ Build Insights
- Faster C++ builds, simplified: a new metric for time
- The Coalition Sees 27.9X Iteration Build Improvement with Visual Studio 2019
- Faster C++ Iteration Builds
  - Reddit
- C++ Build Analyzer
  - C++ Build Insights SDK

Infix Function Calls with Boost HOF

- Jo Boccara
  - Reddit

Before

```
const bool b = isPrefixOf(prefix, text);
```

After

```
const bool b = prefix <isPrefixOf> text;
```

Polymorphism Decision Table

- Kilian Henneberger

The most thoroughly commented linker script (probably)

- Stargirl
  - GitHub
  - Reddit

How can I write a C++ class that iterates over its base classes?

- Raymond Chen
  - Reddit

Template specialization and instantiation

- Xiang Fan, Microsoft
  - Reddit

C++ Performance Trap #1: Constant-size std::vector

- Scott Wolchok
  - Reddit
  - Software optimization resources, by Agner

C++ Performance Trap #2: Unnecessary std::function

- Scott Wolchok
  - Reddit

Inlining and Compiler Optimizations

- Scott Wolchok
  - Reddit

The perils of the accidental C++ conversion constructor

- Raymond Chen
  - Reddit

No one hates C++ more than the people who love C++. ⇒

Making Win32 APIs More Accessible to More Languages

- Microsoft
  - C++/WinRT

C++ and game engines

- Reddit

> *Hey, i started out with c++ 3 months ago and really love it. I already have some experience in unity, but i d like to use c++. Is there any engine you would recommend me to try out? I know about Unreal Engine but i cant find any good tutorials for how to use c++ with unreal engine. Is there any other option or a tutorial series or anything you could recommend me?*

Game developers, what compiler optimization setting do you use?

- Reddit

Adding elements to arrays and changing variables during compilation – imperative meta-metaprogramming in C++

- Dugi
  - Reddit

Anonymous types in C++

- Jan Bielak
  - Reddit

```cpp
1  constexpr auto simplify(struct_(int numerator, denominator;) ratio) ->
       decltype(ratio)
2  {
3      int gcd = std::gcd(ratio.numerator, ratio.denominator);
4      return { ratio.numerator / gcd, ratio.denominator / gcd };
5  }
```

Documenting C++ code

- Reddit
  - Doxygen, Sphinx + Breathe ⇒ {fmt}
  - Standardese
  - clang-doc
  - hdoc
  - Adobe Hyde

YAVE: Functional reactive visual programming language written in C++20

- Reddit
  - GitHub (C++20, LGPL)

Possibility of adding operators to handle nullptr easier ("??", "?→")

- Reddit

CMake and the Future of C++ Package Management

- Borislav Stanimirov
  - Reddit

Fixed math header only library with MIT licence

- Reddit
  - GitHub (C++17, MIT)

Coderrect Scanner

A fast static analysis tool for detecting race conditions in C++ code.
Supports pthreads, `std::thread`, OpenMP, and more.

- Home Page
  - Reddit

Purely academic purposes Compile-time Turing Machine in C++20

- GitHub
  - Reddit

X-Macros

- Arthur O'Dwyer
  - Reddit

Interesting technique, I hate it. ⇒

A C++20 container concepts library

This library aims to provide general purpose concepts that are not available in the C++20 concepts library, most notably container concepts.

- GitHub
  - Reddit

Motivating examples of coroutines

- Reddit
- Previously: Reddit

std::jthread and cooperative cancellation with stop token

- Article on Nextptr
  - Reddit

Time Travel Debugging for C/C++

- Article
  - Reddit

Number Parsing at a Gigabyte per Second

- Daniel Lemire
  - Paper
  - Reddit
  - fast_float (GitHub)
  - The Eisel-Lemire ParseNumberF64 Algorithm
  - Go Systems talk (YouTube)

Abbreviated Function Templates and Constrained Auto

- Sy Brand, Microsoft
  - Reddit

Why no standard library support for command line parsing?

- Reddit
  - P0781R0 A Modern C++ Signature for `main`
  - TCLAP - Templatized Command Line Argument Parser: SourceForge, GitHub
  - Gflags, GitHub
  - Cxxopts
  - CLI11
  - Boost.Program_options
  - Quick Arg Parser: GitHub, Reddit
  - Lyra
  - Clara, blog post by Marius Bancila

```
1 std::vector<std::string_view> args(argv, argv+argc);
```

Moving Faster: Everyday Efficiency in Modern C++

- C++Now 2018, YouTube
  - Reddit

C++ HTML

- J.F. Bastien

Reference Views

rviews (reference views) is a header-only C++17 library that allows viewing an STL container via another STL container with lvalue semantics. E.g. you could view a list as it would be a vector, or even as it would be a map, or even both.

```cpp
std::list<char> data{'a', 'b', 'c'};
vector_view view{data};
std::cout << view[0] << std::endl; // a
std::cout << view[1] << std::endl; // b
std::cout << view[2] << std::endl; // c
```

- GitHub
  - Reddit
  - See also: Vista
  - See also: Boost flat_map

Conceptual

A C++20 library adapting preexisting type_traits into concepts, as well as improving upon the preexisting standard ones with better subsumption.

- GitHub
  - Reddit

C++ Memory Safety

- Reddit

Hot reloading C++ for rapid development with the help of **fungos/cr**

- Alex Dixon
  - fungos/cr
  - cr.h: A Simple C Hot Reload Header-only Library

Video: Pavel Novikov - "Understanding Coroutines by Example" - C++ London

- YouTube
  - Reddit
  - Slides

VirtualMultiArray

Multi graphics card based C++ virtual array implementation that uses OpenCL just for the data transfers on PCIe bridge.

- GitHub
- Wiki
- Reddit