C++ Club UK Meeting 122

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What (relatively) easy to implement features would you like to see in C++23?

- Reddit

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

- Reddit

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

- GitHub
    - Reddit

X-Macros

- Arthur O’Dwyer
  - Reddit

C++ HTML

- J.F. Bastien

Is Zero a Butterfly?

- Shafik Yaghmour
  - Reddit

Polymorphism Decision Table

- Kilian Henneberger

Infix Function Calls with Boost HOF

- Jo Boccara
  - Reddit

Before

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

After

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

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

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

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

- Dugi
  - Reddit

std::optional and other useful types

- Reddit

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

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

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

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)

Anonymous types in C++

- Jan Bielak
  - Reddit

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

Documenting C++ code

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

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

> *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

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.

```
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

Boosting Productivity and Performance with the NVIDIA CUDA 11.2 C++ Compiler

- NVIDIA
  - Reddit

> *All useful stuff for machine learning is written for cuda, so everyone is forced to buy Nvidia. Been waiting for opencl pytorch backend for years, but it just seems like nobody really has a reason to do it.* #