

C++ Club Meeting Notes

Gleb Dolgich

2018-12-13

Bjarne Stroustrup on CppChat

► YouTube

- ▶ education
- ▶ The Standards Committee
- ▶ C++20 and beyond



Matt Godbolt on CppChat

► YouTube

- ▶ Compiler Explorer, contributors, infrastructure
- ▶ Tools -> LLVM MCA (machine code analyser), Clang Tidy, PAHole
- ▶ Patched compiler versions to explore new features
- ▶ Code execution is coming
- ▶ Undefined behaviour



C++Now 2018: Matt Godbolt - What else has compiler done for me lately? (1/7)

YouTube

The screenshot shows a YouTube video player. At the top right, there's a green circular logo with 'C++ now' and the text '2018 MAY 7 - 11 cppnow.org'. The main video frame on the right shows Matt Godbolt, a man with short brown hair, wearing a grey and black zip-up hoodie, standing and gesturing with his hands while speaking. Below the video frame, the name 'Matt Godbolt' is displayed. To the left of the video frame, the title 'Registers' is centered above a bulleted list of register names. At the bottom right of the video frame, there's a small logo for 'Video Sponsorship Provided By' followed by a yellow and red graphic.

Registers

- rax, rbx, rcx, rdx, rsp, rbp, rsi, rdi, r8-r15
- xmm0-xmm15
- rdi, rsi, rdx... arguments
- rax is return value

What Else Has My Compiler Done For Me Lately? Unbolting the Compiler's Lid...Again

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C++Now 2018: Matt Godbolt - What else has compiler done for me lately? (2/7)

REGISTERS

63...56 55...48 47...40 39...32 31...24 23...16 15...8 7...0

rax							
(zeroed on write)				eax			
				ax			
				ah	al		

C++ now **2018**
MAY 7 - 11
cppnow.org

Matt Godbolt

What Else Has My Compiler Done For Me Lately? Unbolting the Complier's Lid...Again

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AT&T

C++Now 2018: Matt Godbolt - What else has compiler done for me lately? (3/7)

C++ now
2018
MAY 7 - 11
cppnow.org

A photograph of Matt Godbolt, a man with short brown hair, wearing a grey and black zip-up hoodie, standing in front of a window and a whiteboard, gesturing with his right hand.

Matt Godbolt

What Else Has My Compiler
Done For Me Lately? Unbolting
the Complier's Lid...Again

INSTRUCTIONS

```
op
op dest
op dest, src
op dest, src1, src2
```

- op is e.g. call, ret, add, sub, cmp...
- dest, src is register or memory reference:
[base + reg1_{opt} + reg2*(1, 2, 4 or 8)_{opt}]

(Intel asm syntax)

A set of small, light-colored navigation icons typically used in Beamer presentations, including arrows for navigation and symbols for search and refresh.

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The AT&T logo, which consists of the letters "AT&T" in a bold, sans-serif font inside a red diamond shape.

6/23

C++Now 2018: Matt Godbolt - What else has compiler done for me lately? (4/7)

C++ now
2018
MAY 7 - 11
cppnow.org

INSTRUCTIONS

```
mov eax, DWORD PTR [r14]
add rax, rdi
add eax, DWORD PTR [r14+4]
sub eax, DWORD PTR [r14+4*rbx]
lea rax, [r14+4*rbx]
xor edx, edx
```

```
int eax = *r14; // int *r14;
rax += rdi;
eax += r14[1];
eax -= r14[rbx];
int *rax = &r14[rbx];
edx = 0;
```



Matt Godbolt

What Else Has My Compiler
Done For Me Lately? Unbolting
the Complier's Lid..Again



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C++Now 2018: Matt Godbolt - What else has compiler done for me lately? (5/7)

COMPILER EXPLORER 'V0.1'

```
$ g++ /tmp/test.cc -O2 -c -S -o - -masm=intel \
| c++filt \
| grep -vE '\s+\.'
```

```
sum(std::vector<int, std::allocator<int> > const&):
.LFB786:
    mov rcx, QWORD PTR [rdi]
    mov rax, QWORD PTR 8[rdi]
    sub rax, rcx
    shr rax, 2
    mov rsi, rax
    ...
```



Matt Godbolt

What Else Has My Compiler Done For Me Lately? Unbolting the Complier's Lid...Again

Video Sponsorship Provided By:



C++Now 2018: Matt Godbolt - What else has compiler done for me lately? (6/7)

The image shows a screenshot of the Compiler Explorer interface. On the left, there is a code editor window containing the following C++ code:

```
1 // setup...
2 int func() {
3     auto a = make_unique<int>(42);
4     auto b = make_unique<int>(24);
5     return *a + *b;
6 }
```

On the right, there is a terminal window showing the generated assembly code:

```
1 func(): # @func()
2     mov eax, 66
3     ret
```

At the top right of the slide, there is a logo for "C++ now" and the text "2018 MAY 7 - 11 cppnow.org". Below the logo is a video frame showing Matt Godbolt speaking. The video frame has his name "Matt Godbolt" and the title "What Else Has My Compiler Done For Me Lately? Unbolting the Compiler's Lid Again". At the bottom right, there is a logo for "Video Sponsorship Provided By" with a stylized yellow and red arrow graphic.

C++Now 2018: Matt Godbolt - What else has compiler done for me lately? (7/7)

The screenshot shows a video player interface. At the top right, there is a logo for "C++ now" with the text "2018 MAY 7 - 11 cppnow.org". Below the logo is a video frame showing a man with short brown hair, wearing a grey and black zip-up hoodie, standing and speaking. The video has a dark green overlay with white text. The title of the video is "Matt Godbolt" and the subtitle is "What Else Has My Compiler Done For Me Lately? Unbolting the Compiler's Lid..Again". Below the video frame, there is a "Video Sponsorship Provided By:" section featuring a logo for "AT&T". On the left side of the video player, there is a code editor window with the text "\$ make" in a terminal-like interface.

- ▶ [GitHub](#)
- ▶ [Image](#)

IntelliCode in Visual C++

- ▶ [VCBlog](#)
- ▶ [YouTube](#)
 - ▶ Uses SFML: Simple and Fast Multimedia Library

IntelliCode uses machine learning to train over thousands of real-world projects including open-source projects on GitHub. As such, IntelliCode will be most helpful when using common libraries such as STL. Based on this training, IntelliCode saves your time by putting what you're most likely to use at the top of your IntelliSense completion list.

VS2019 Preview

- ▶ Release notes
- ▶ Live Share
 - ▶ Blog post
 - ▶ Reddit

CLion 2019 Roadmap

- [Blog post](#)

IKOS static analyzer from NASA

- ▶ [GitHub](#)
- ▶ [Reddit announcement](#)

IKOS is a **sound** static analyzer for C and C++ based on LLVM, developed at NASA.

Here, **sound** means that it is mathematically correct and cannot miss a bug, thanks to the theory of Abstract Interpretation. The counterpart is that it might produce false positives.

IKOS checks for a lot of undefined behaviors, such as buffer overflows, divisions by zero and so on. The full list is available [here](#). The list is somewhat similar to UBSan checks.

Concepts



Ólafur Waage

@olafurw

Andrew Sutton said something like this at CppCon:

"You can make your own concepts, but be careful, it's harder than you think!"

I went, "What do you mean? It's just compile time template argument validation. How hard can it be?"

Then I saw std::Boolean

en.cppreference.com/w/cpp/concepts...

23 Likes

2 Retweets

5 Dec 2018 at 12:00

via TweetDeck

std::Boolean concept

Standard Ranges, by Eric Niebler

- ▶ [Blog post](#)

Ranges got merged and will be part of C++20. This is huge news and represents probably the biggest shift the Standard Library has seen since it was first standardized way back in 1998.

Library: SQLite ORM

SQLite ORM light header only library for modern C++

- ▶ [Code](#) (BSD-2-Clause)

- ▶ C++14
- ▶ No raw string queries
- ▶ CRUD support; pure select query support
- ▶ Custom types binding support
- ▶ Supports: BLOB - maps to std::vector<char> or a custom type;
FOREIGN KEY; composite keys; JOIN; transactions; ORDER BY and LIMIT,
OFFSET, GROUP BY / DISTINCT, INDEX, COLLATE
- ▶ Migration functionality
- ▶ The only dependency - **libsqllite3**
- ▶ No undefined behaviour - if something goes wrong lib throws an exception
- ▶ In-memory database support - provide :memory: or empty filename

Library: Inja - a template engine for modern C++

► Code

- ▶ Licence: MIT
- ▶ Header-only
- ▶ Uses NLoehmann's [JSON library](#)
- ▶ [Conan wrapper](#)

```
1 json data;
2 data["name"] = "world";
3 inja::render("Hello {{ name }}!", data); // Returns "Hello world!"
```

Library: C++ REST SDK (formerly Casablanca) by Microsoft

► **Code**

- ▶ Licence: MIT
- ▶ C++11
- ▶ Supports Windows, Linux, macOS, iOS, Android

The C++ REST SDK is a Microsoft project for cloud-based client-server communication in native code using a modern asynchronous C++ API design. This project aims to help C++ developers connect to and interact with services.

Library: Caffe2 - A New Lightweight, Modular, and Scalable Deep Learning Framework

- ▶ [Website](#)
- ▶ [Code](#)
- ▶ Licence: Apache-2.0

Tool: Superluminal profiler for Windows

Website

- ▶ Combines sampling and instrumentation
- ▶ Visualizes thread communication flow
- ▶ Kernel-level callstacks
- ▶ Dynamic filtering of areas of interest
- ▶ High frequency sampling (8 KHz)
- ▶ Timeline view, call graph, source view
- ▶ 7-day free trial, then EUR 99/149/289

Twitter



Eric Niebler
@ericniebler

My other car is a Vasa.

13 Likes	0 Retweets
6 Dec 2018 at 22:42	via Twitter Web Client

Reddit

r/ProgrammerHumor • i.redd.it

I find this cup to represent Java perfectly

u/SLYGUY1205

