What's New in Visual Studio for C++ Developers in 2025

AUGUSTIN POPA & DAVID LI

Meet the Speakers

David Li

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Microsoft

🚀 Mission of the C++ product team at Microsoft

Empower every C++ developer and their teams to achieve more

- by participating in the creation of the **C++ Standards**
- by investing in the **MSVC Build Tools**
- by simplifying acquisition in C++ via **vcpkg**
- by improving the **Visual Studio IDE**
- by continuing to enhance the C++ experience for **Visual Studio Code**

Microsoft @ CppCon

https://aka.ms/cppcon/vs

Mon.	16:45	Building Secure Applications: A Practical End-to-End Approach	Chandranath Bhattacharyya & Bharat Kumar
Tues.	09:00	What's new in VS Code: CMake Improvements and GitHub Copilot Agents	Alexandra Kemper
	14:00	What's new in Visual Studio for C++ Developers in 2025	Augustin Popa & David Li
	14:00	Back to Basics: Code Review	Chandranath Bhattacharyya & Kathleen Baker
Wed.	14:00	LLMs in the Trenches: Boosting System Programming with AI	Ion Todirel
	15:15	C++ Performance Tips: Cutting Down on Unnecessary Objects	Kathleen Baker & Prithvi Okade
	15:50	Connecting C++ Tools to AI Agents Using the Model Context Protocol	Ben McMorran
	16:45	Welcome to v1.0 of the meta::[[verse]]!	Inbal Levi
Thurs.	14:00	MSVC C++ Dynamic Debugging: How We Enabled Full Debuggability of Optimized Code	Eric Brumer
	16:45	It's Dangerous to Go Alone: A Game Developer Tutorial	Michael Price
Fri	9:00	Reflection-based JSON in C++ at Gigabytes per Second	Daniel Lemire & Francisco Geiman Thiesen
	13:30	Duck-Tape Chronicles: Rust/C++ Interop	Victor Ciura

Visual Studio

Microsoft

Agenda

1. Major Announcements
2. Understand, Edit, and Navigate Your Code
3. Manage Libraries and Build Your Project
4. Debug and Diagnose Issues
5. Commit Changes to Source Control

Visual Studio

Microsoft

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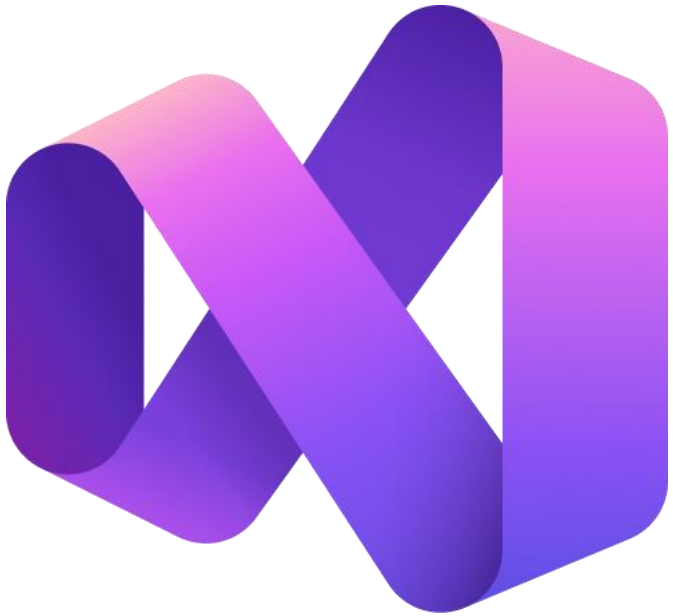
Introducing

Microsoft



Visual Studio 2026

C++ Feedback Tickets

Last 12 months

387

Issues

Fixed

29

Feature requests

Implemented

Feedback tickets across Visual Studio

Last 12 months

4489

Issues

Fixed

290

Feature requests

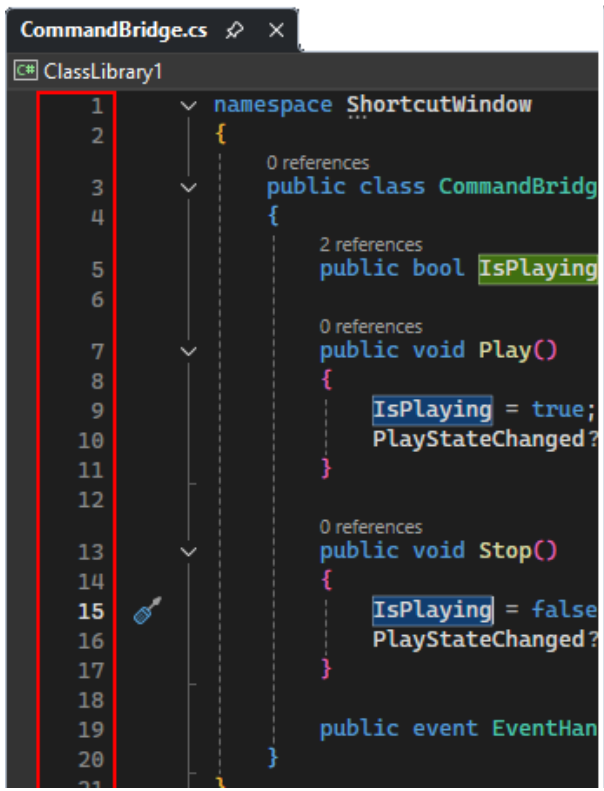
Implemented

You asked

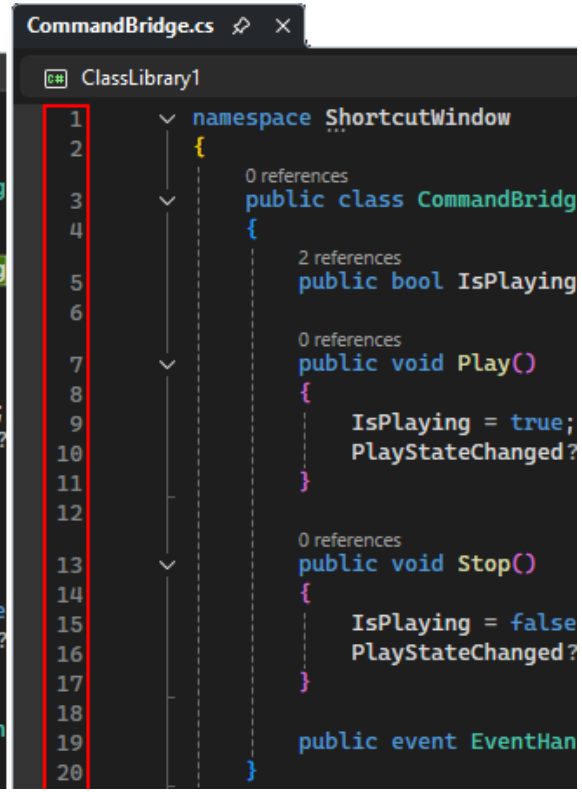
Every detail matters

Getting the experience *just right*

2022



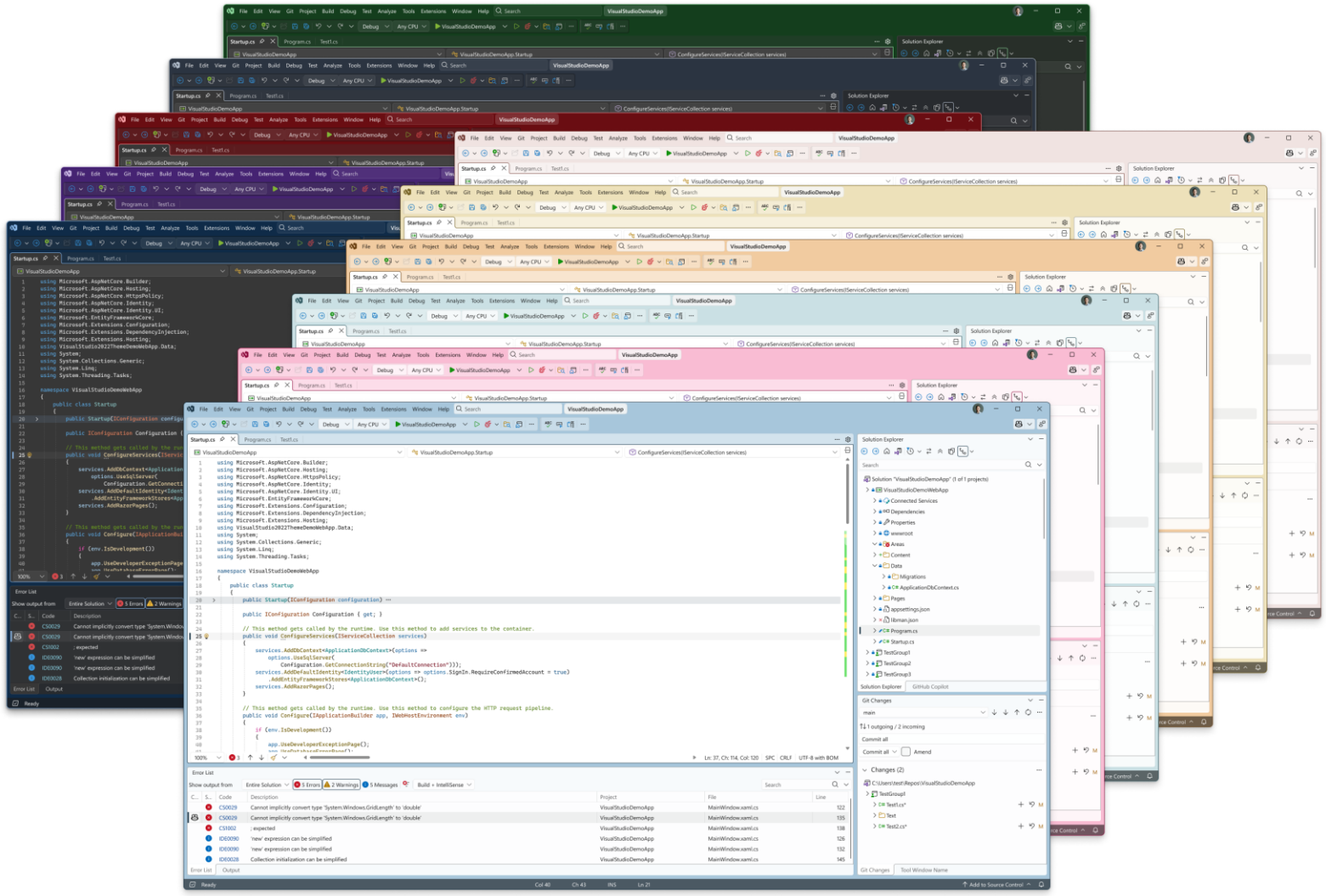
2026



You asked

Personalization

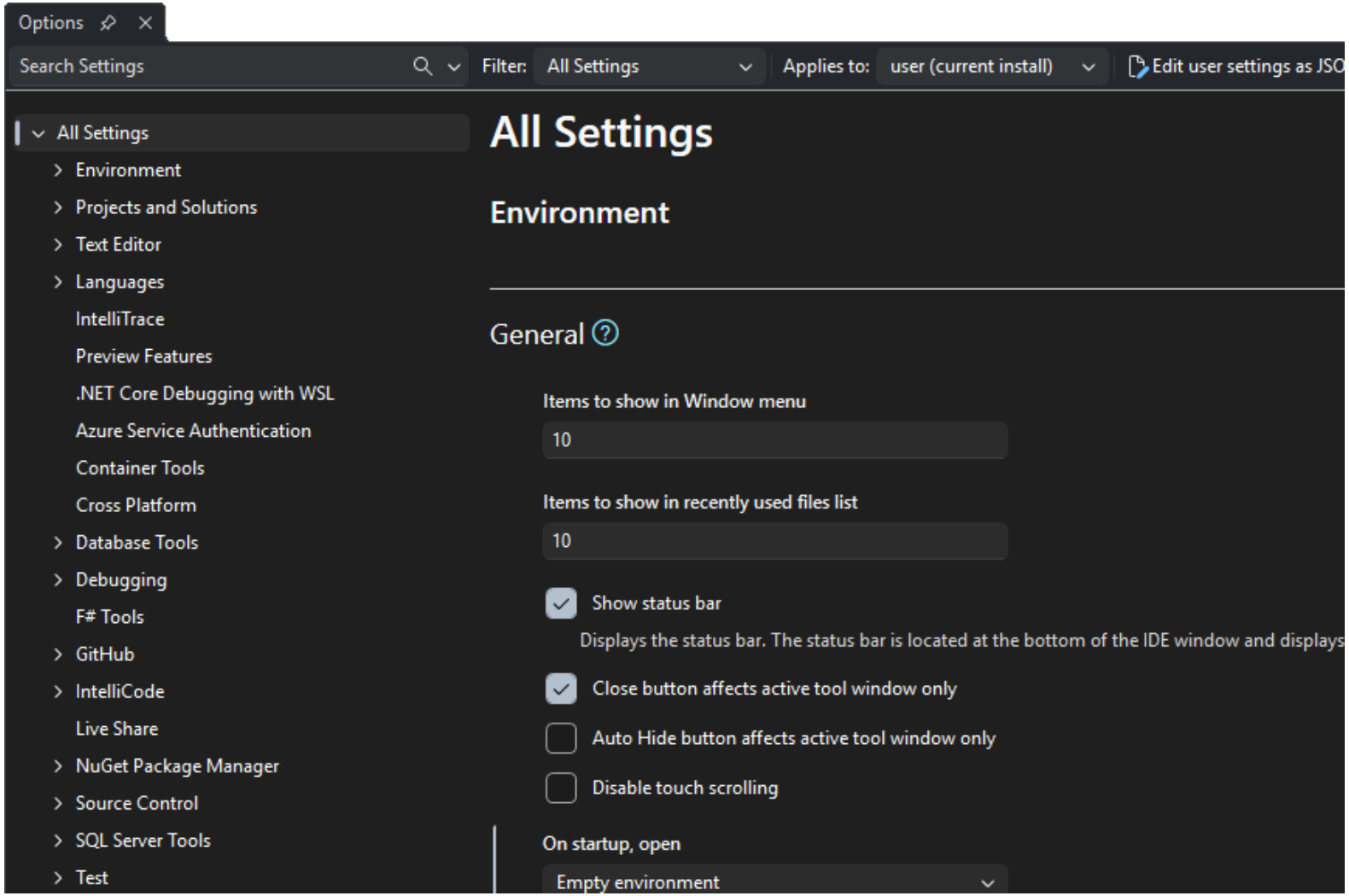
Make Visual Studio uniquely yours



You asked

New settings

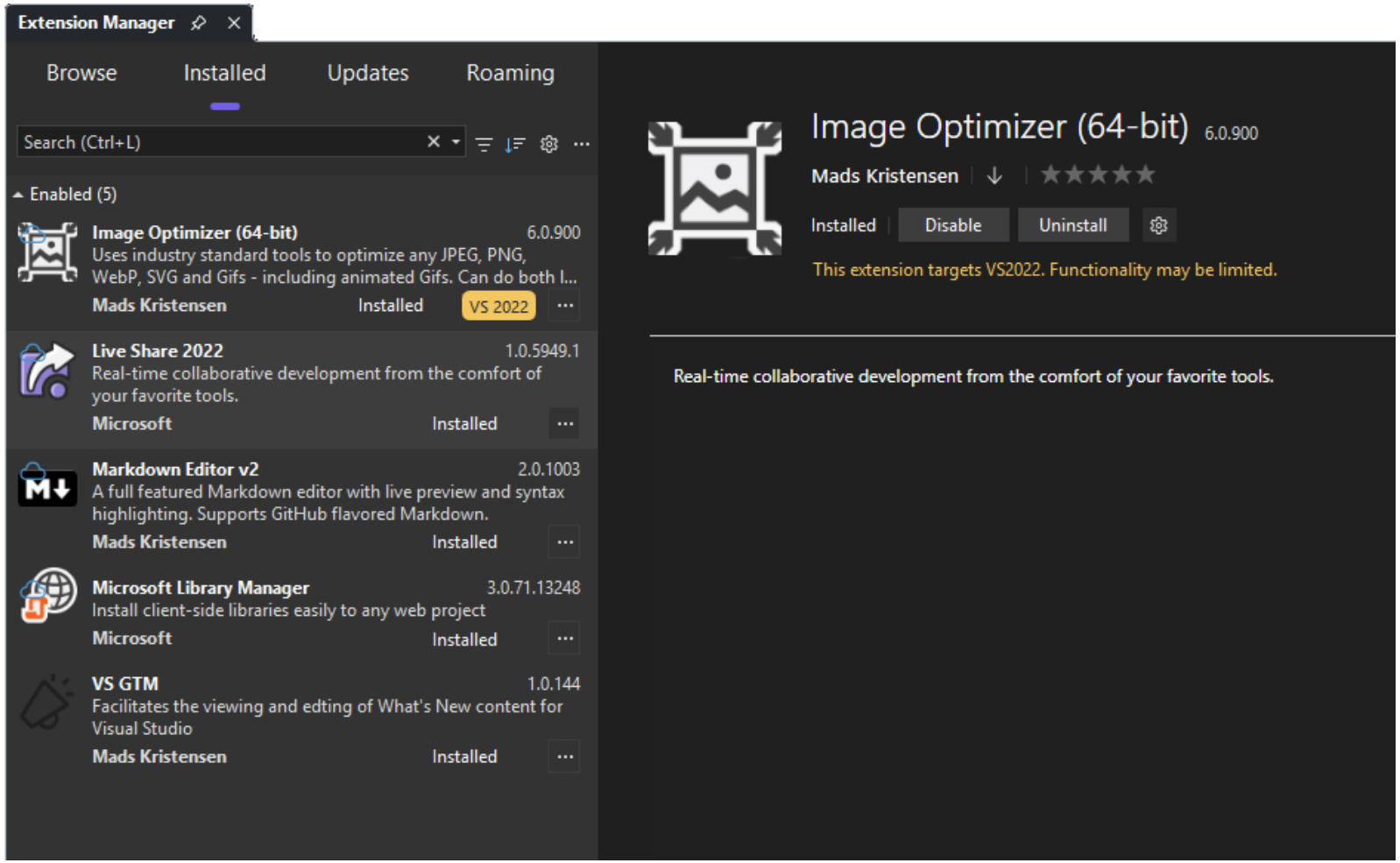
Backed by JSON – ready for the future



You asked

Extensions

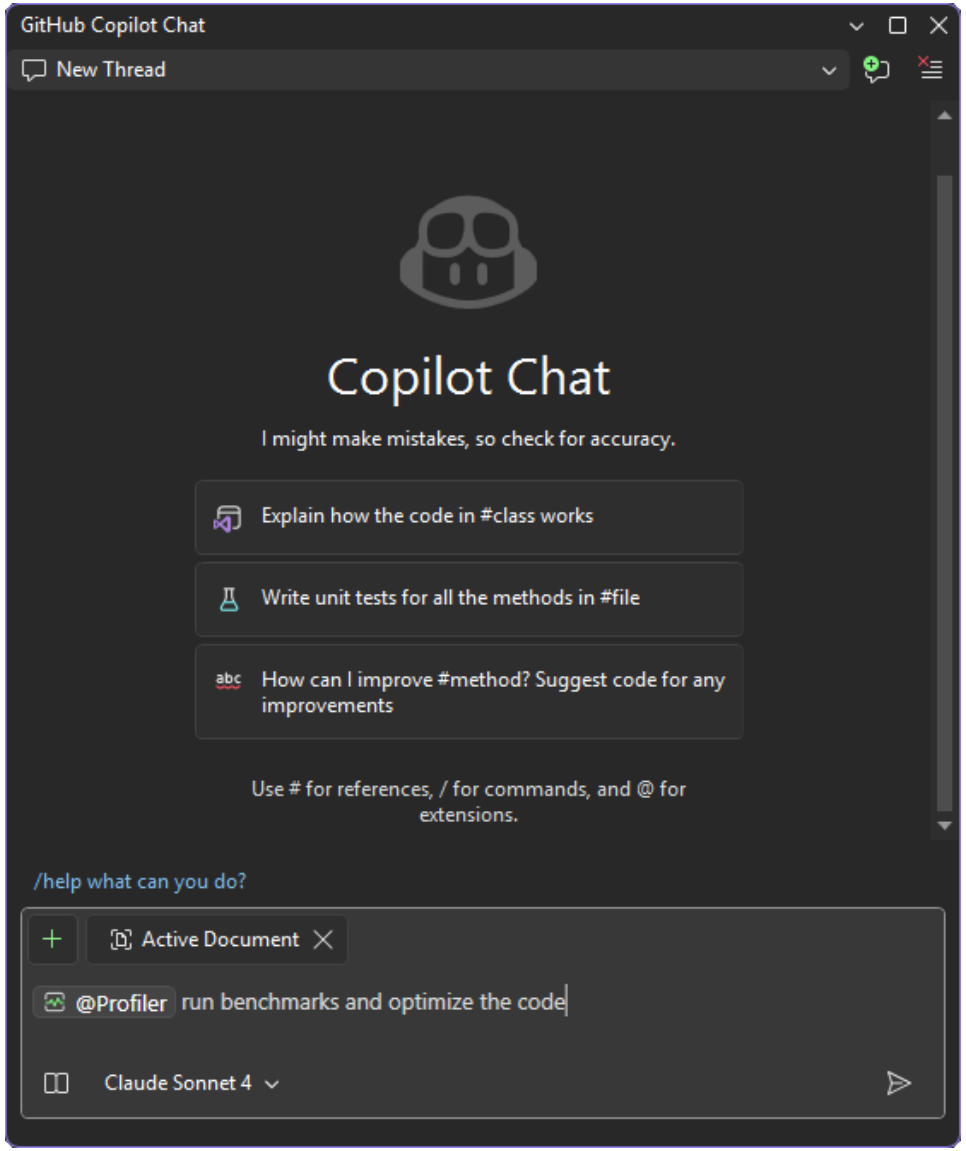
Works with your existing extensions



Deeper integration

Copilot

Copilot supports you every step of the way



Visual Studio

Microsoft

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Demo

Microsoft

Native CMake Support in Visual Studio

- Ideal for projects targeting multiple platforms
- Key Features:
  - CMake Presets support to configure your environment
  - CMake Targets View
  - CMake Debugger
- CMake Presets v9 support with macro expansion (17.13)
- IntelliSense for CMake modules (17.14)
  - Quick Info, completion, hover details
- Native support for CPU Usage, Events Viewer, and File IO tools in Visual Studio (18.0 Preview 1)

Learn more: aka.ms/cmake

Microsoft

Linux Targeting Support in Visual Studio

- Create and debug Linux applications in Visual Studio
- Work from your local Visual Studio environment while your work seamlessly syncs with the Linux remote
- Target remote Linux environments or Windows Subsystem for Linux (WSL)

- Key Features:
  - SSH to remote Linux target
  - Remote File Explorer
  - Run, debug, and run unit tests remotely from the IDE
  - Supported for MSBuild and CMake projects

Learn more: aka.ms/cpp/linux

Microsoft

Introducing

Agent Mode

AI is evolving from passive helpers to autonomous agents.

AI Agents can understand intent, plan actions, and carry out tasks with minimal input.

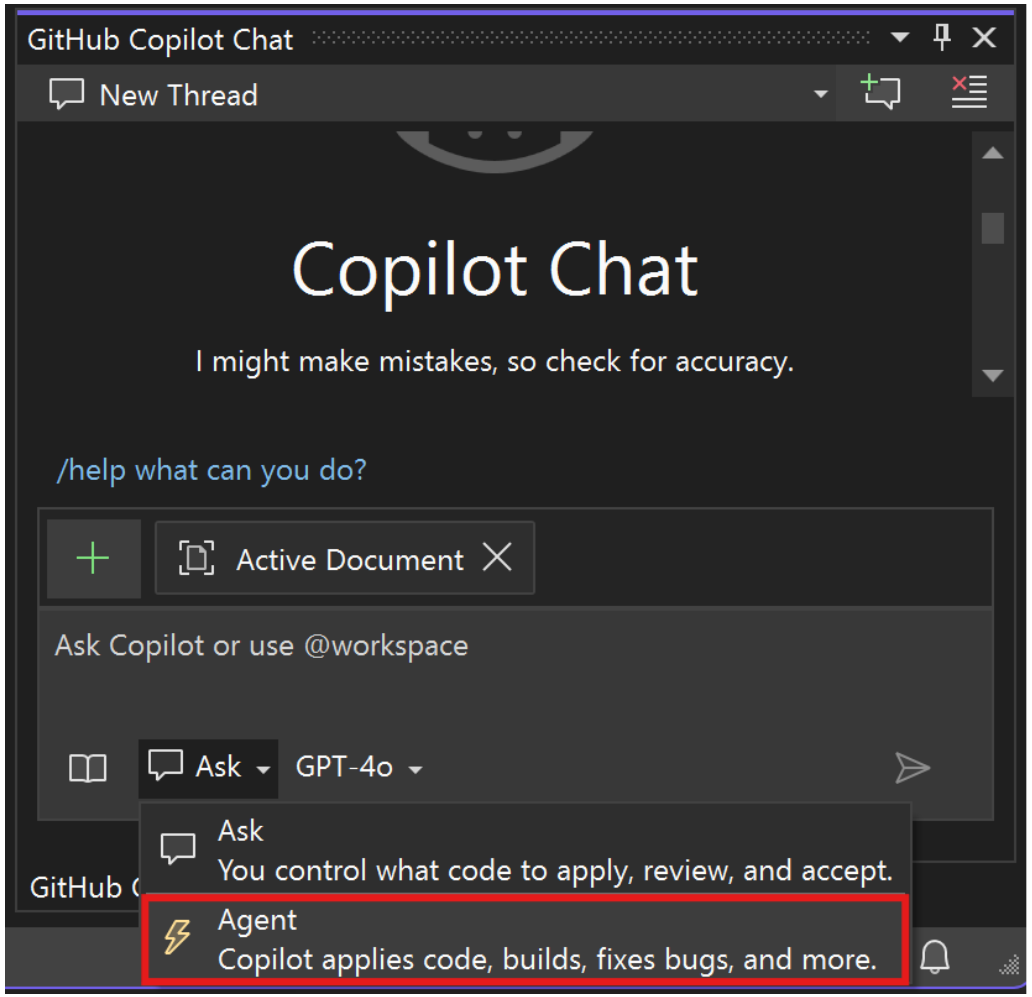
Autonomous Multi-Step Execution

Context-aware Automation

Testing and Debugging Automation

GitHub Copilot Improvements

- Free tier
- Agent Mode + MCP Support
- C++ completion enhancements
- Next Edit Suggestions
- Model Picker + Bring Your Own Model

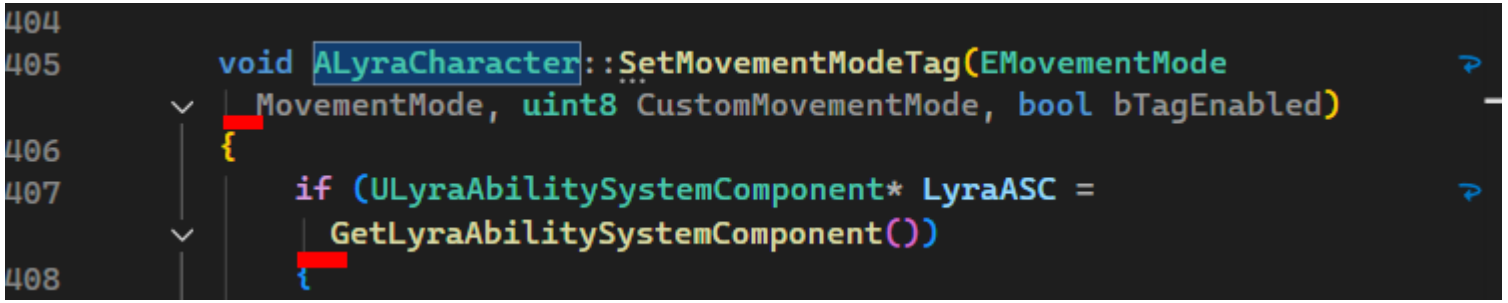


Boost your Productivity

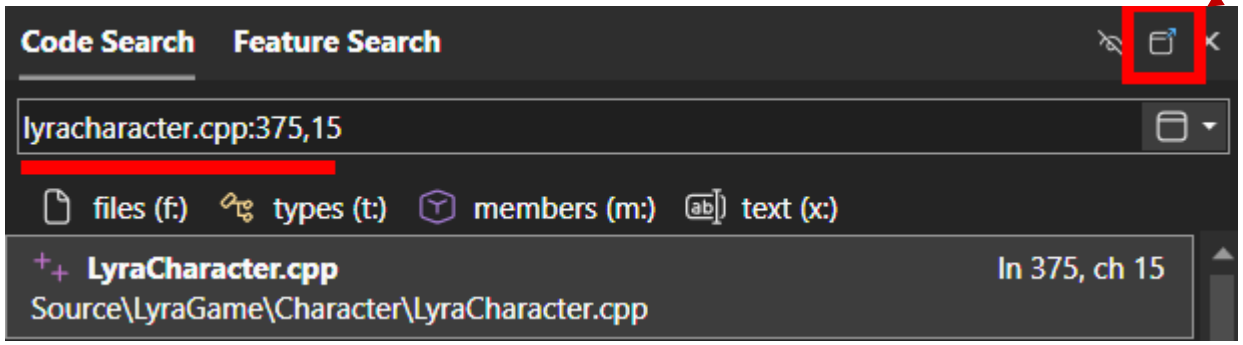
Microsoft

Word Wrap Indentation

Tools > Options > Text Editor > General > Automatically indent when word wrap is enabled

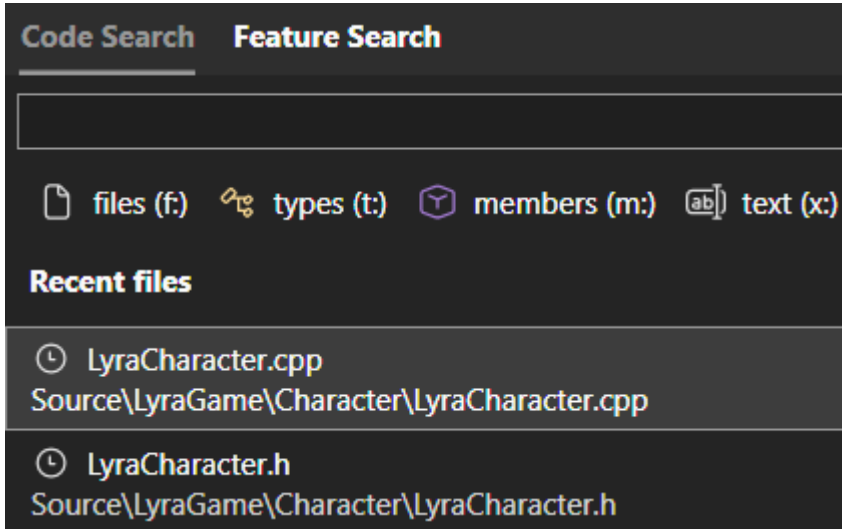


Enhanced Line & Column Navigation

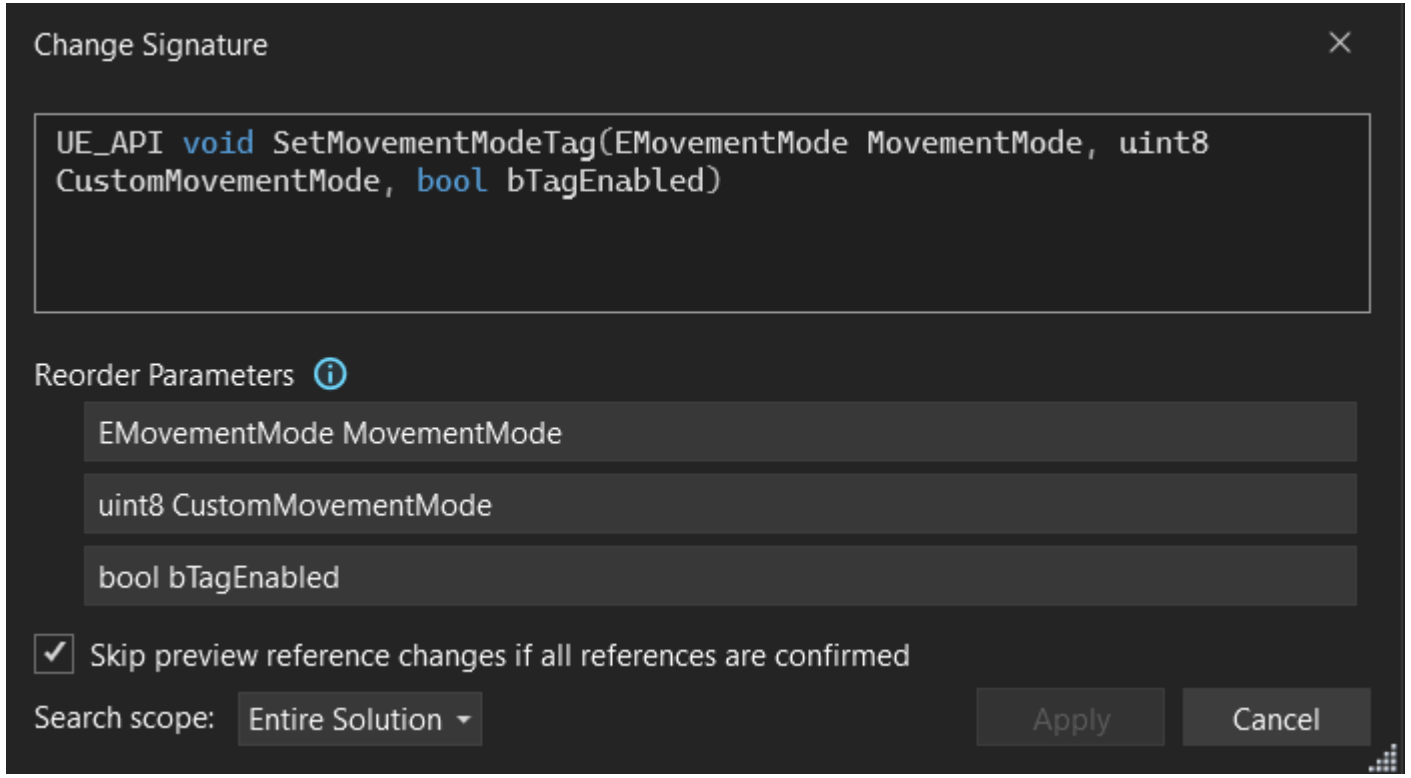


Dock Window

Open Recent Files in Search



Boost your Productivity



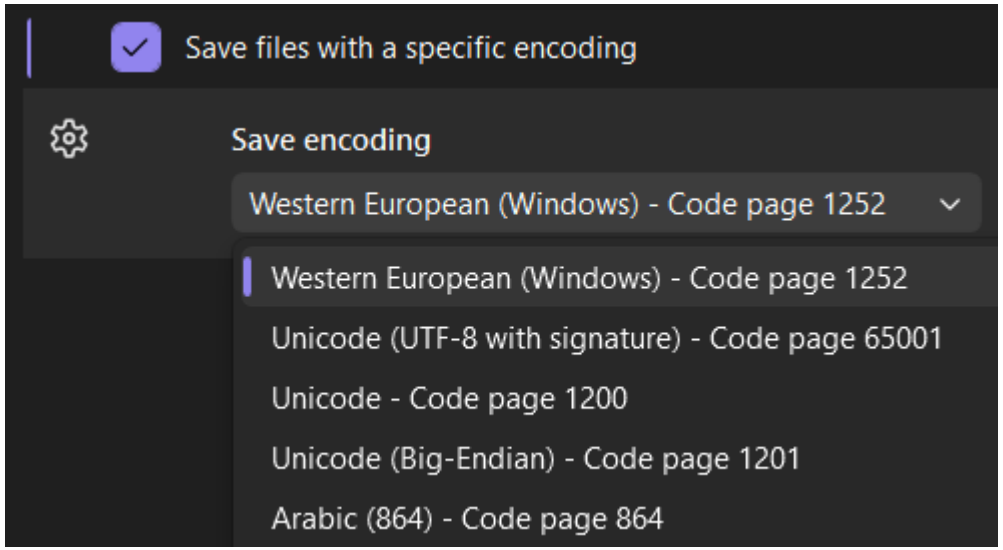
Change Signature Improvements

- Drag and Drop Parameter
- Edit Full Signature

- Press **Ctrl + .**
  - Select *Change Signature*

Save with specific file encoding

Tools > Options > Environment > Documents



Visual Studio

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Microsoft

Clang/LLVM Support in Visual Studio

- Install and use Clang in Visual Studio
- Target Windows and Linux
- Supported in MSBuild and CMake project systems

Learn more: aka.ms/cpp/clang/msbuild
aka.ms/cpp/clang/cmake

MSVC Build Tools

- The compiler of choice for Windows development
- Optimized build performance
- Build secure applications and libraries
- New with VS 2026: **MSVC version 14.50**
  Platform Toolset v145

MSVC Standards Conformance

Microsoft

- ✅ C++98*
  * with /permissive-
- ✅ C++11
- ✅ C++14
- ✅ C++17
- ✅ C++20
- 🛵 C++23
  with /std:c++23preview
- 🚲 C++26
  with /std:c++latest

🏁 New Features

- Formatting Ranges
- Multidimensional subscript operator
- std::generator
- Removing unnecessary '()' from lambdas
- Attributes for lambdas
- Narrowing contextual conversions to bool
- static operator(), static operator[]
- if consteval
- size_t literals

Compiler Updates in v14.50: aka.ms/msvc-1450

STL C++23 Features: aka.ms/STL-cpp23

MSVC Standards Conformance

Microsoft

✅ C++98*

* with /permissive-

✅ C++11

✅ C++14

✅ C++17

✅ C++20

🛵 C++23

with /std:c++23preview

🚲 C++26

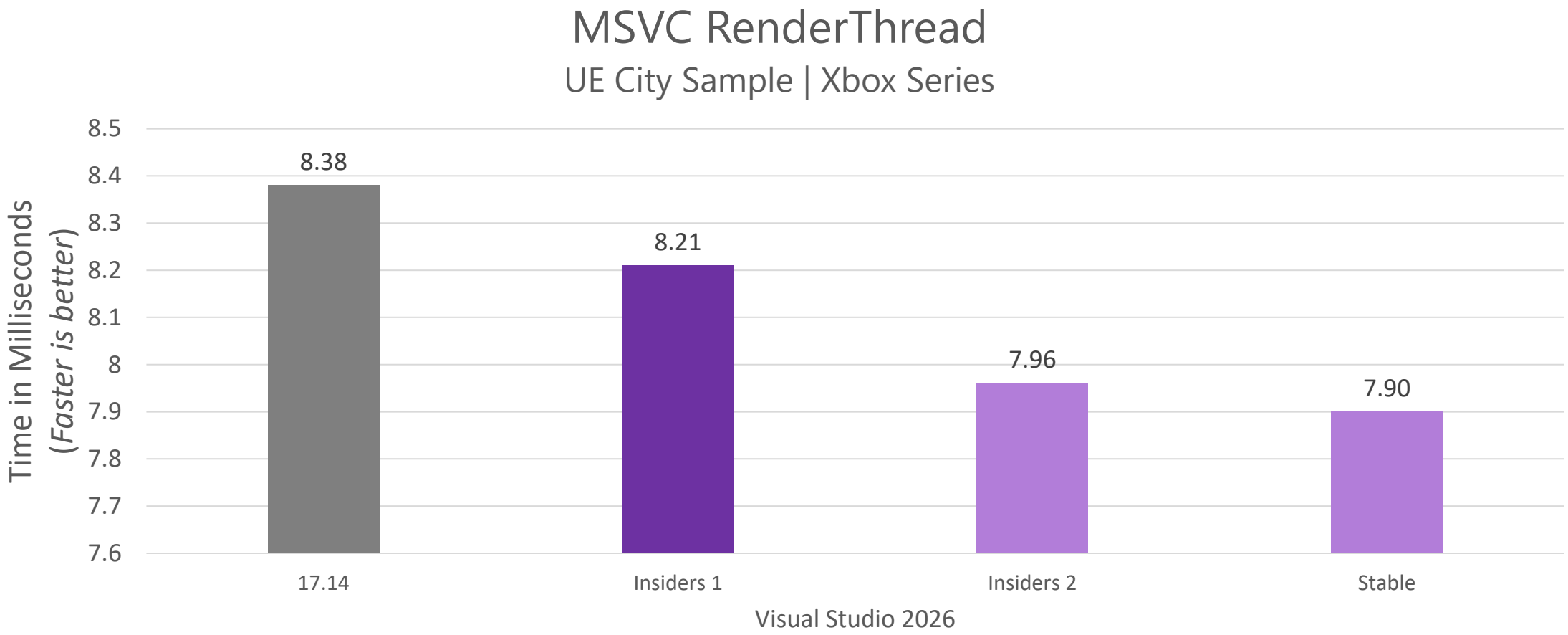
with /std:c++latest

🏁 New Features

- Standard library hardening (partial support)
- atomic_ref<cv T>
- Put monostate in <utility>

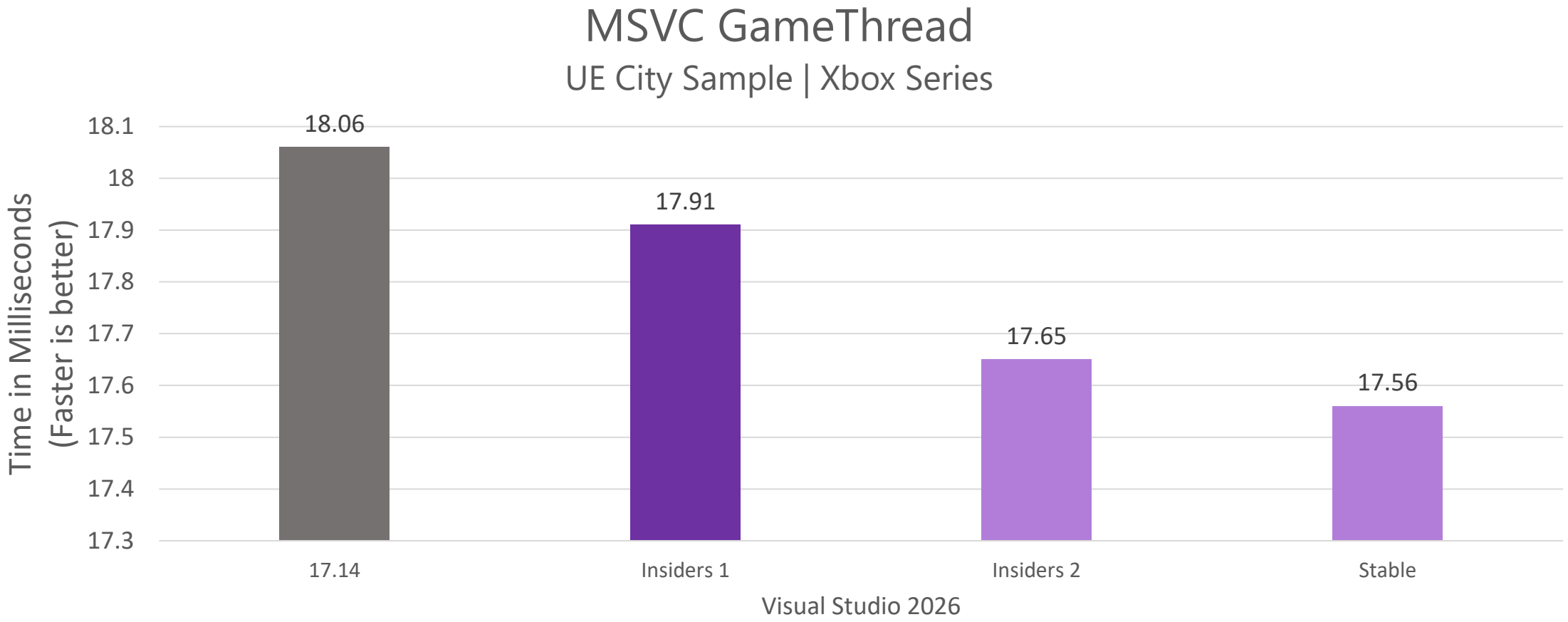
STL C++26 features: aka.ms/STL-cpp26

Faster MSVC Runtime Performance



Better AVX vectorization & improved code gen for struct fields and branches

Faster MSVC Runtime Performance



Better AVX vectorization & improved code gen for struct fields and branches

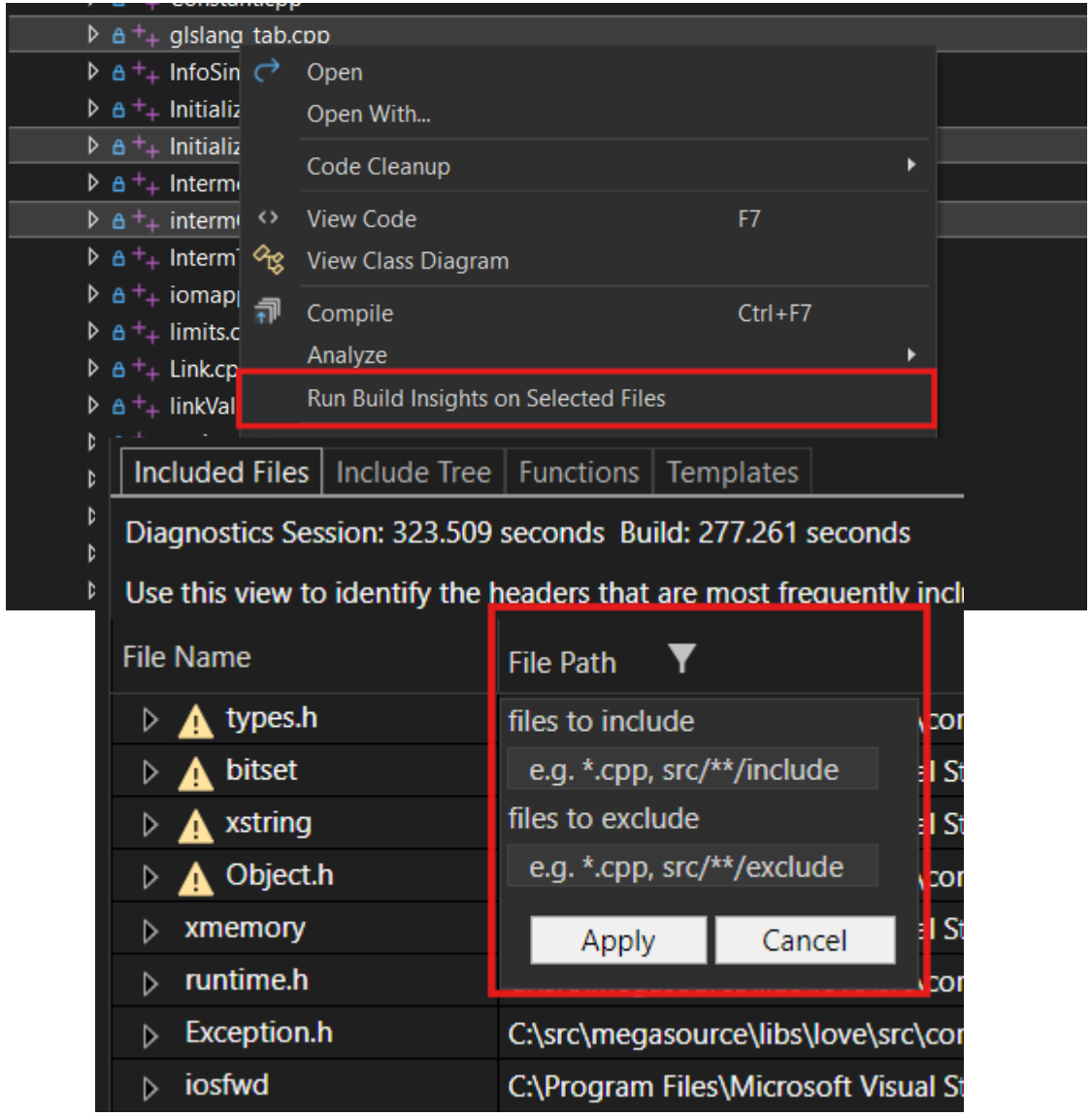
Microsoft

C++ Build Insights

- Provides critical info to optimize your MSVC build times
- Are your builds sufficiently parallelized?
- What should you include in your pre-compiled header?
- Is there a bottleneck you should focus on to increase build speeds?

Learn more: aka.ms/cpp/buildinsights

C++ Build Insights – New Features



- Run Build Insights on selected files
- Project and pattern filtering
- Tools > Options: Store Build Insights reports in this directory…
- View tab explanations with documentation links
- Simplified path display with hover-to-view full paths

Learn more: aka.ms/cpp/buildinsights

Microsoft

Customer Success

ACTIVISION®

Build Insights Reduced Call of Duty's Build Time by 50%

"With Build Insights, we uncovered inefficiencies that were slowing us down and implemented changes that made a massive difference."

— Rulon Raymond, Senior Director of Technology at Infinity Ward, Activision

CALL OF DUTY®
MW | WARZONE™

Case Study: aka.ms/BuildInsightsMW2

Microsoft

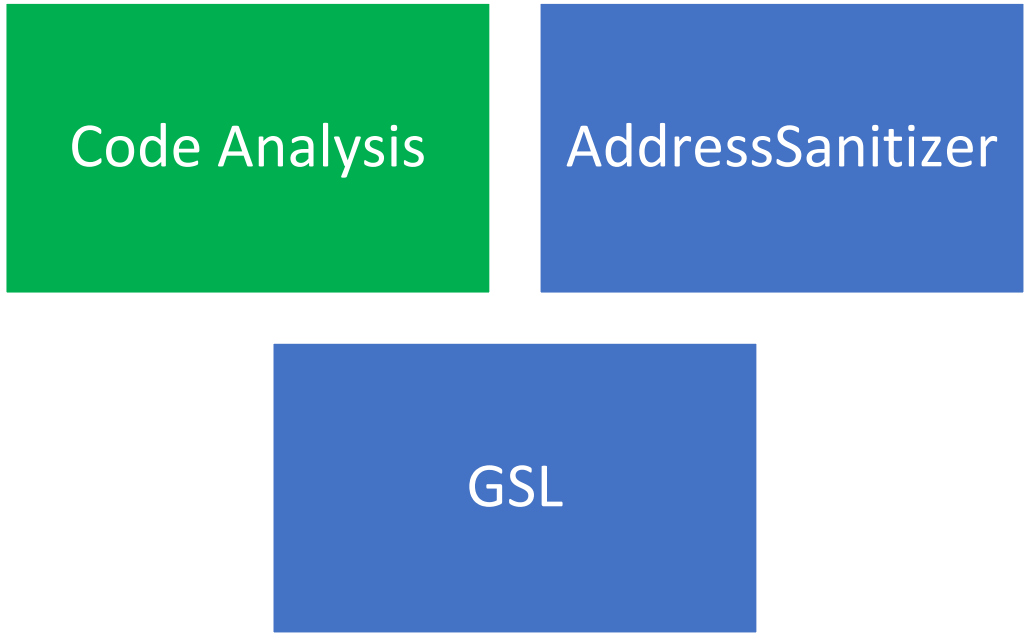
Code Safety & Security

Code Analysis

AddressSanitizer

GSL

Code Safety & Security



Microsoft C and C++ Code Analysis

Find defects like buffer overruns, uninitialized memory, null pointer dereferences, memory and resource leaks

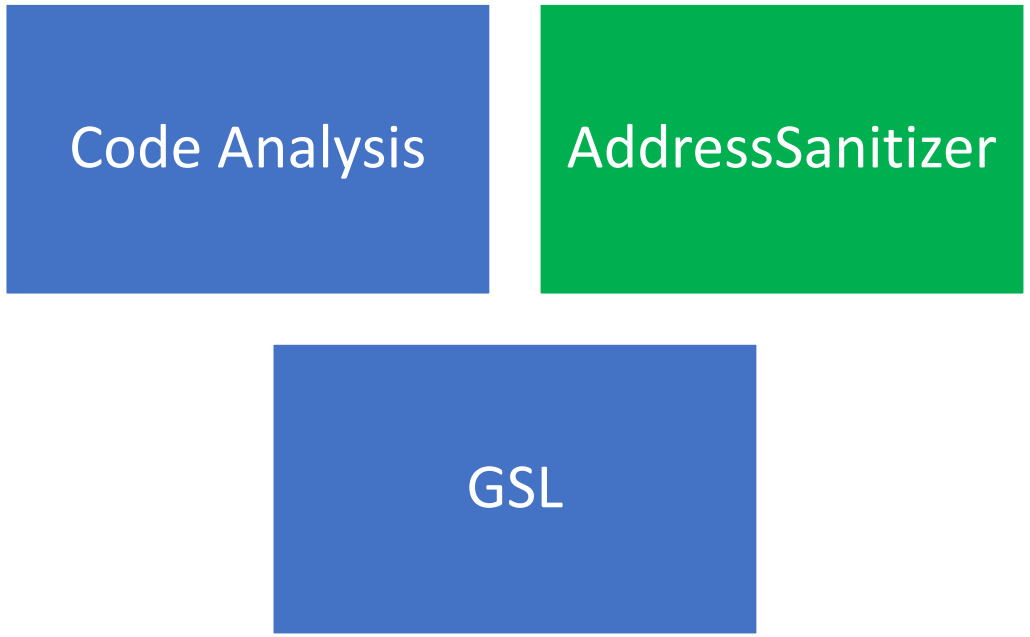
Validate compliance with C++ Core Guidelines

Improvements over the past year:

- Concurrency and Locking: new diagnostics
- Enhanced overflow detection for allocations
- Improved warning suppressions

Learn more: https://aka.ms/cpp/code-analysis

Code Safety & Security



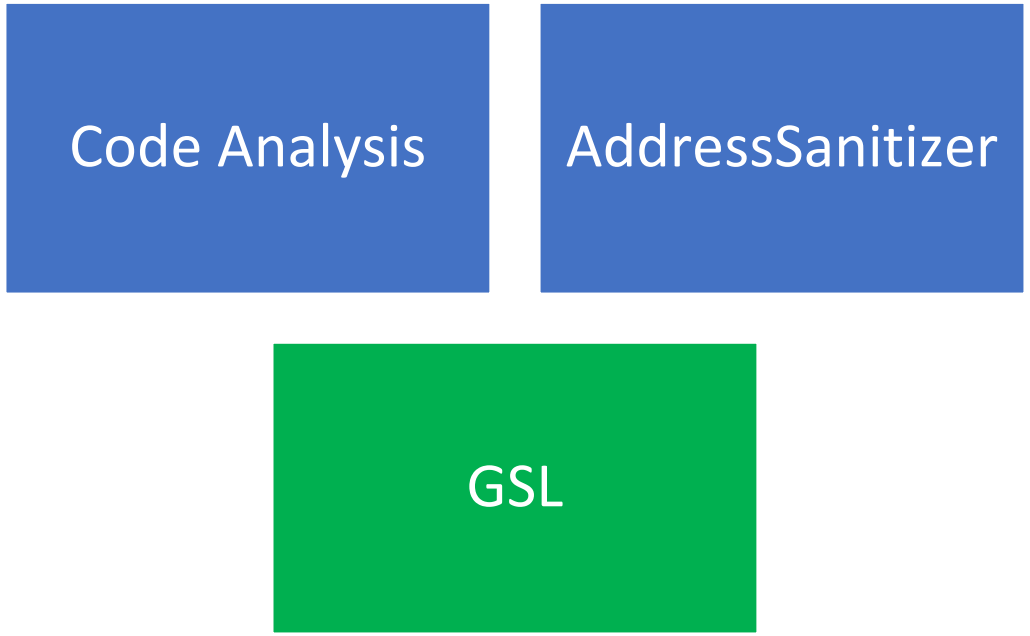
MSVC AddressSanitizer

Identify hard-to-find bugs with zero false positives
- Improve correctness and memory safety
- Secure your code
- Stress test your programs
- Validate code changes

ARM64 support coming in future Insiders releases

Learn more: https://aka.ms/ASAN

Code Safety & Security



Microsoft Guidelines Support Library

Types and functions to write safer, more maintainable code

v4.2.0 released with new features and fixes

Can be installed with vcpkg

Learn more: aka.ms/cpp/gsl

vcpkg: C/C++ package manager

📝 Manifests
Express your dependencies declaratively and lock them down in your source control system.

🔢 Versioning
Choose your preferred package versions and lock them for reproducible builds

📚 Registries
Create your own private library catalogs

🎯 Triplets
Target over 80 different pre-determined environments or define your own custom one

💾 Asset Caching
Continue operating your development environment even if the original source changes or disappears

📦 Binary Caching
Share the compiled libraries you consume locally with your development team and continuous integration system

Available in the Visual Studio IDE with 2600+ ports
Tested and validated for 15 build configurations

Learn more: aka.ms/vcpkg

Microsoft

vcpkg: New in the past year

- Improved package installation speeds (up to +20%)
- Improved binary caching performance (up to +14%)
- GitHub Dependabot support for vcpkg
  - Upgrade your libraries while preserving ABI compatibility with Dependabot and versioning baselines

Learn more: aka.ms/vcpkg

Visual Studio

Microsoft

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Game Development & Large Projects

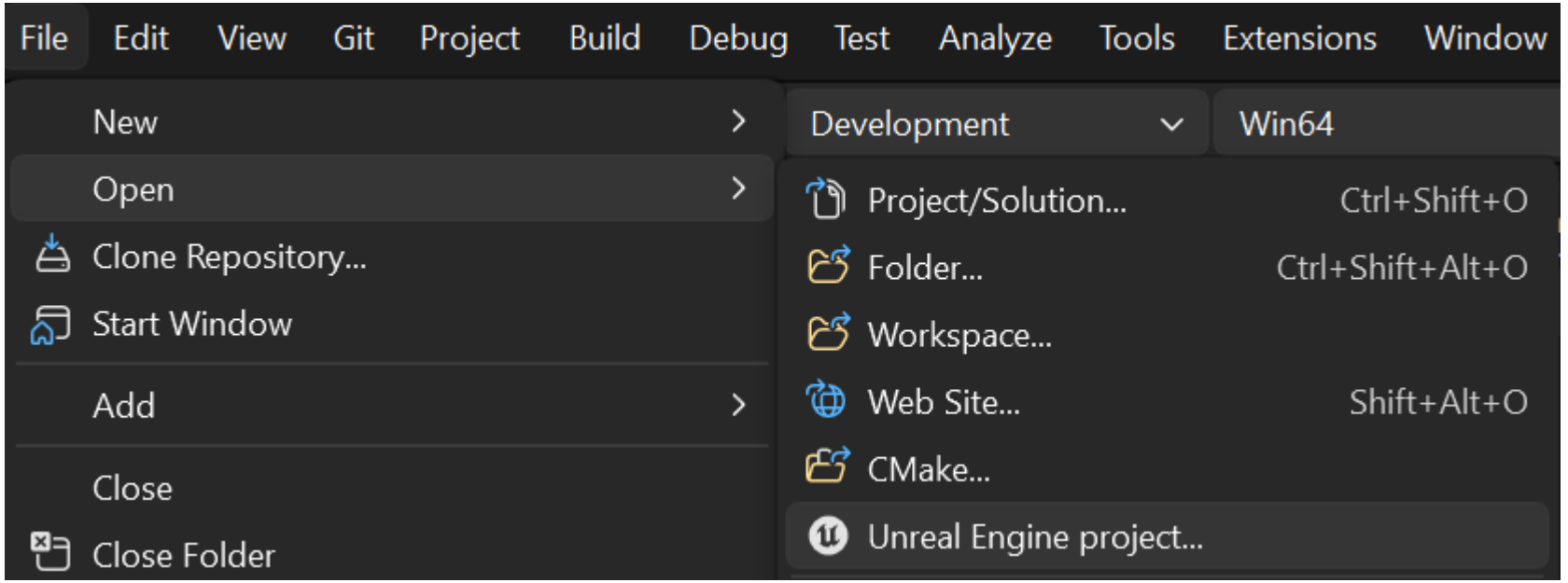
Microsoft

Demo

Directly Open .uproject

Faster and more accurate IntelliSense

No need to regenerate .sln

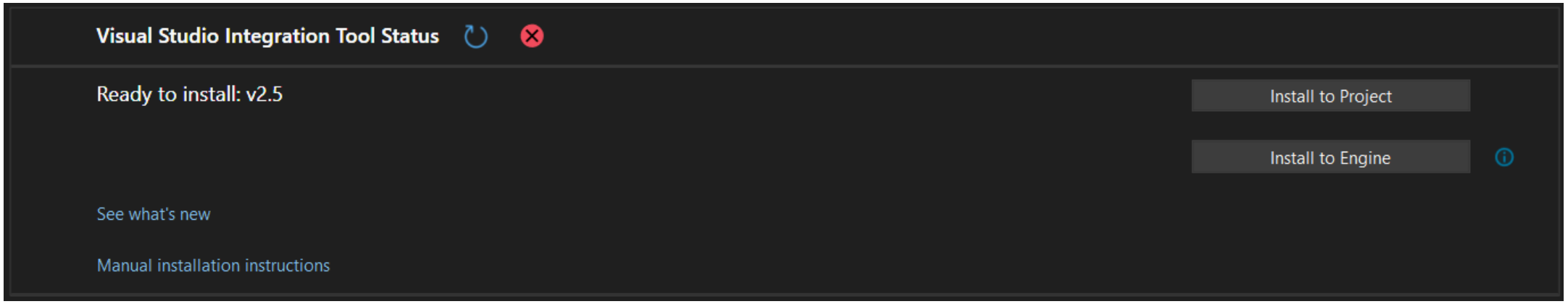


Visual Studio Integration Tool

One-click Install

Open-source on GitHub

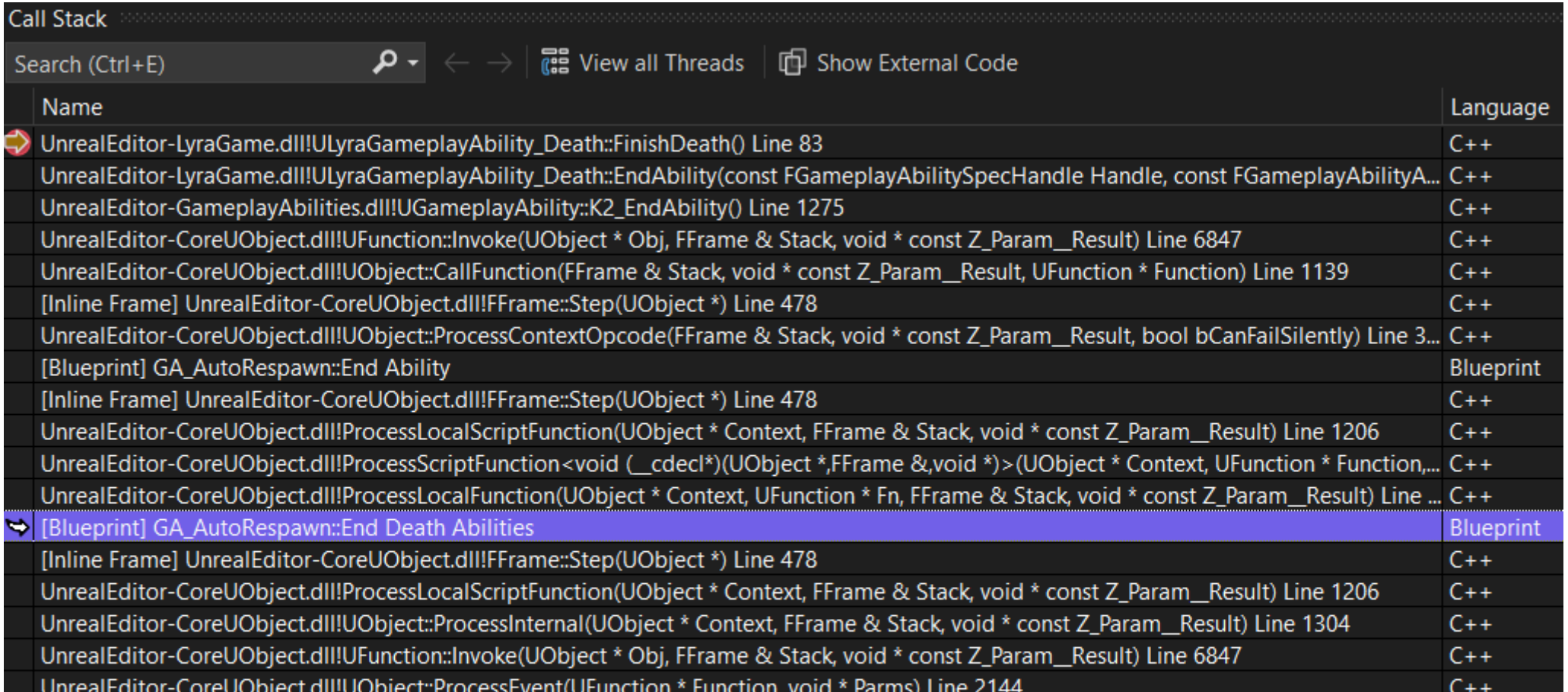
Not needed for Blueprint References



Learn more: aka.ms/vsit

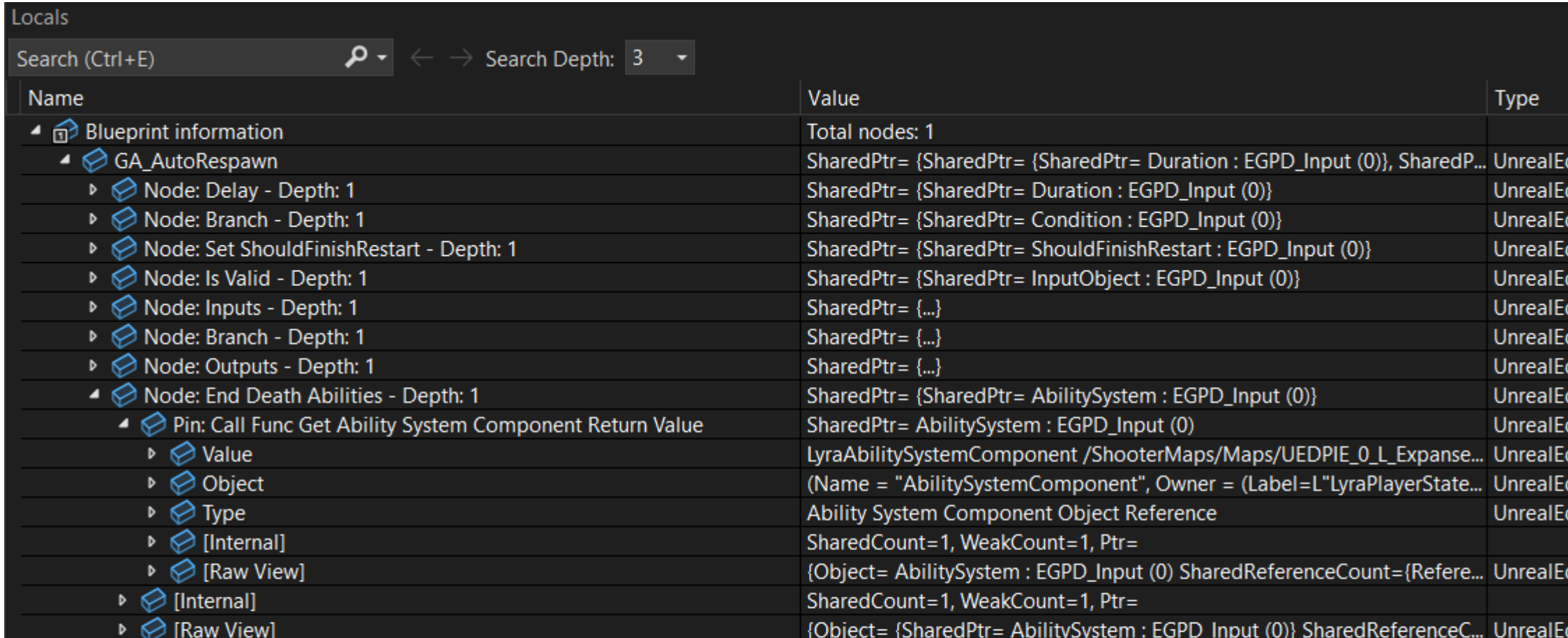
Blueprint Debugger

See Blueprints in Call Stack



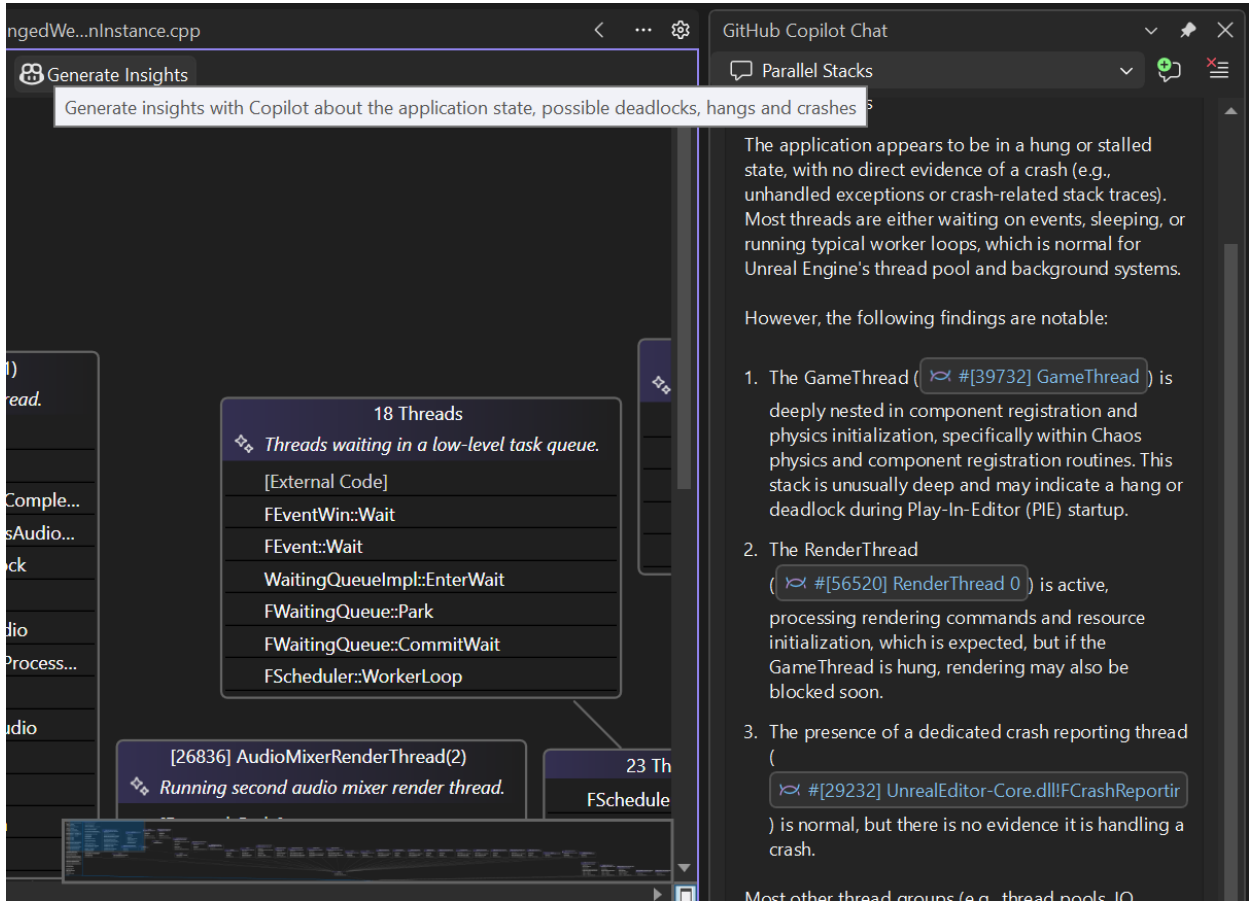
Blueprint Debugger

See Blueprint Information in Locals

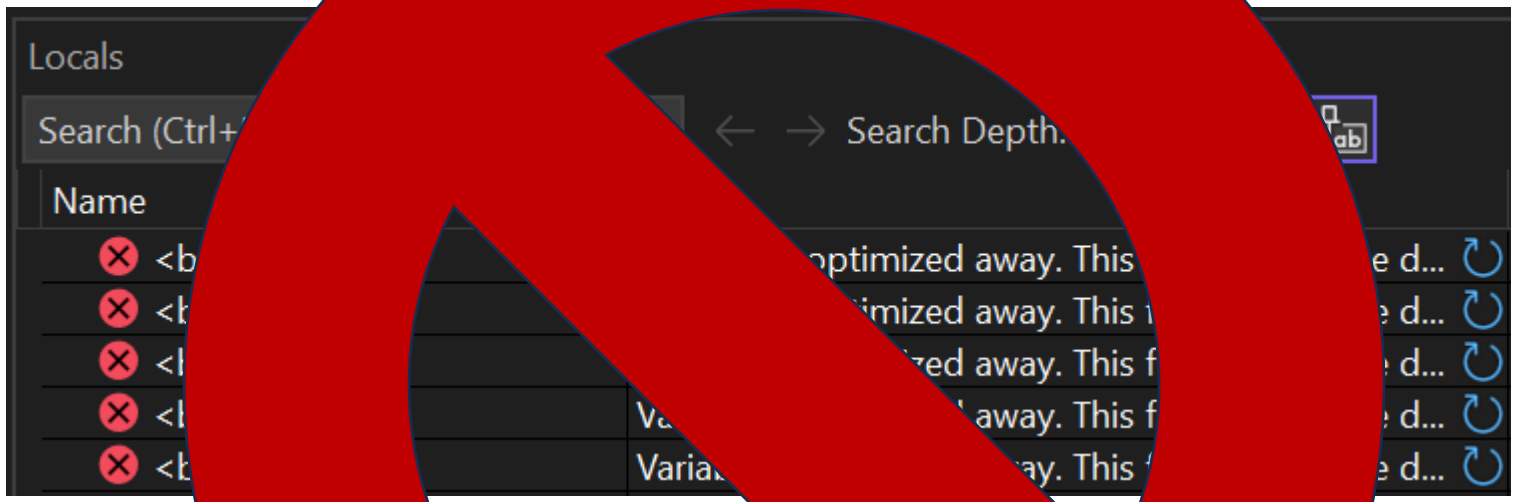


GitHub Copilot Improvements

- Breakpoint Suggestions
- Exception Assistance
- Debug Output / Trace Analysis
- Variable / Return Value Analysis
- Parallel Stacks
  - Deadlock Detection
  - Thread Summarization
  - Insight Generation



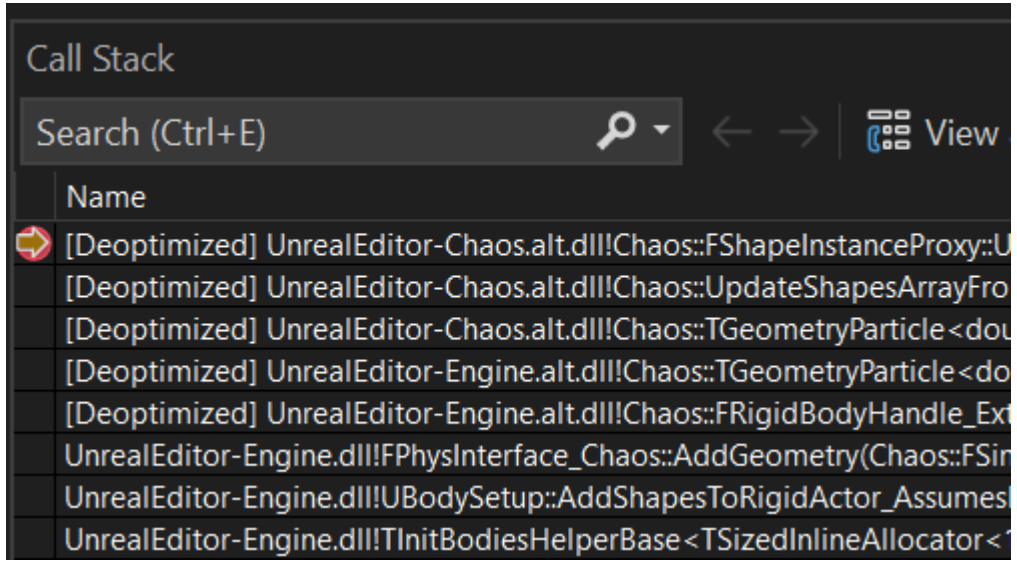
Microsoft




```
#pragma                    ", off)
```

Dynamic Debugging Now in Preview

Visual Studio 2022 **17.14** and later



Learn more: aka.ms/dynamicdebugging

Microsoft

Developer Success

"The new feature is exceptional.
I now have reliable stepwise debugging, variable inspection, and program counter jumping without needing to recompile with pragma optimize."

– Jess Kube

Principal Software Engineer, The Coalition

Developer Success

"Using it daily, the new feature improved my ability to debug and investigate quicker. I don't need to manually deoptimize my files anymore"

– Matthew Koch

Principal Software Engineer, Halo Studios

Microsoft

Developer Success

"With the new feature, breakpoints in inlined functions will now be hit. Previously, I had to use a debug build or #pragma optimize and remember to remove it before code review"

– Keith Stockdale

Senior Software Engineer, Rare

Microsoft

Configuration Requirements

Supported: x64 only, Xbox GDK, FastBuild, IncrediBuild, Unreal Engine

Not Supported:

- LTCG, PGO, OPT-ICF
- Incremental Linking

Learn more: aka.ms/vcdd

Microsoft

Tues 09/16 – 09:00am| Stage 5

What's New for Visual Studio Code: CMake Improvements and GitHub Copilot Agents

Alexandra Kemper

Wed 09/17 – 02:00pm| Stage 3

LLMs in the Trenches: Boosting System Programming with AI

Ion Todirel

Wed 09/17 – 03:50pm| Stage 1

Connecting C++ Tools to AI Agents using the Model Context Protocol

Ben McMorran

Thu 09/18 – 02:00pm| Stage 3

MSVC C++ Dynamic Debugging: How We Enabled Full Debuggability of Optimized Code

Eric Brumer

Thu 09/18 – 04:45pm| Stage 3

It's Dangerous to Go Alone: A Game Developer Tutorial

Michael Price

Fri 09/19 – 01:30pm | Stage 1

Duck-Tape Chronicles: Rust/C++ Interop

Victor Ciura

Visual Studio

Microsoft

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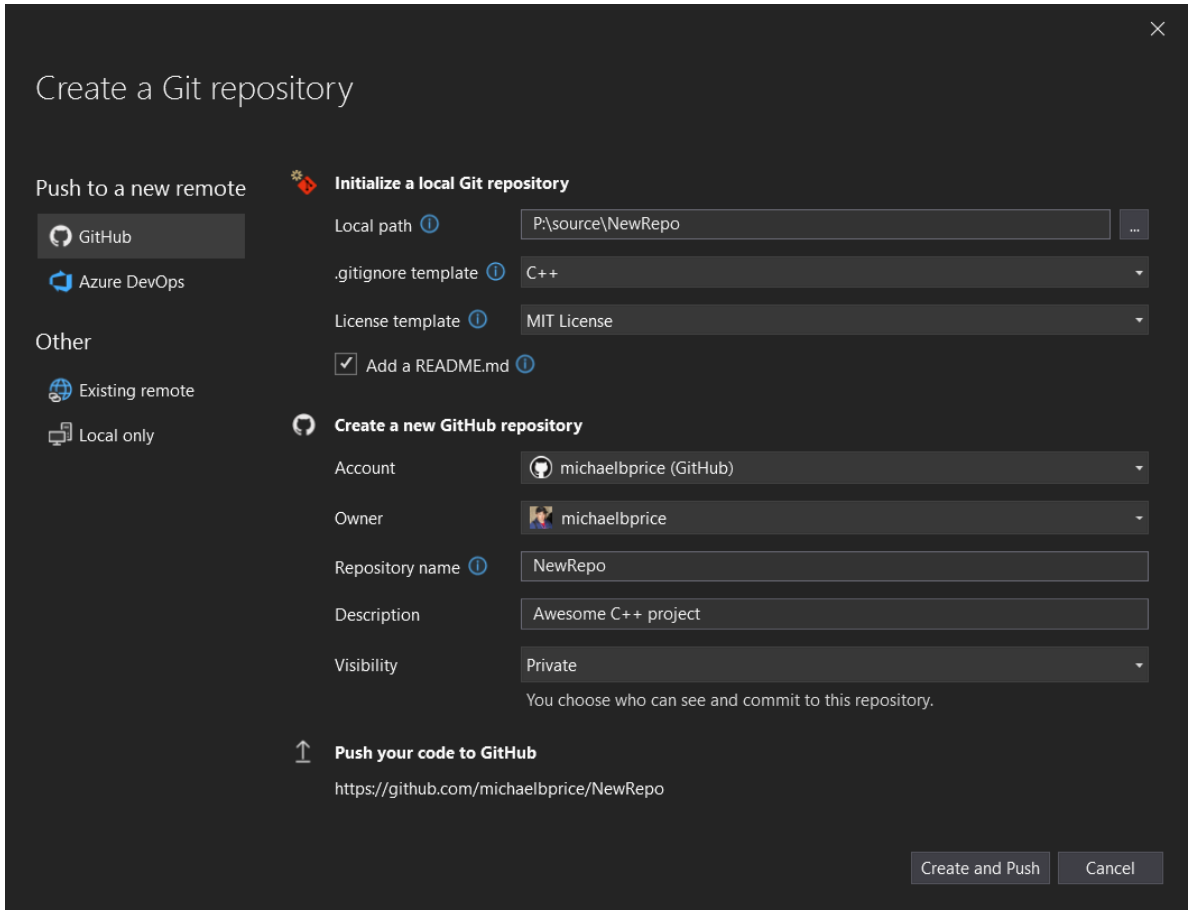
Source Control

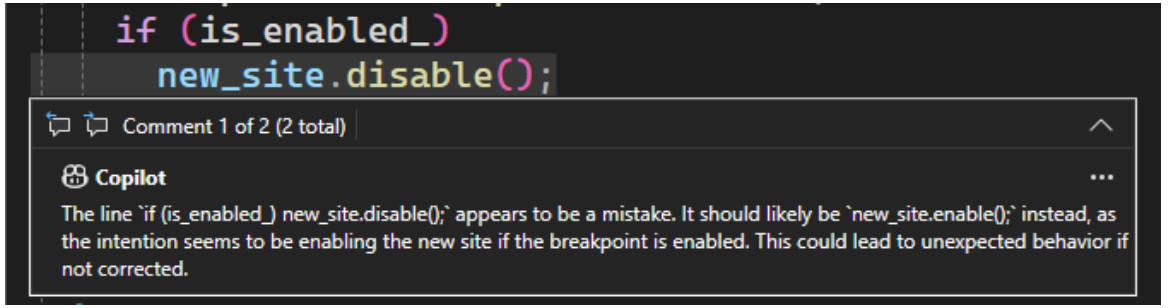


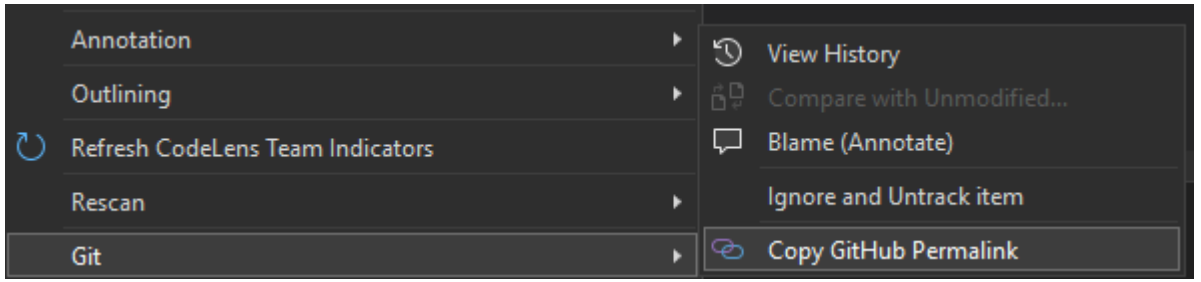
- Integration with popular repository hosting platforms
- Graphical UI for source control operations
- Advanced file comparison and conflict resolution tools
- View commit history and annotate source with commit information
- Support for multiple branches and remotes

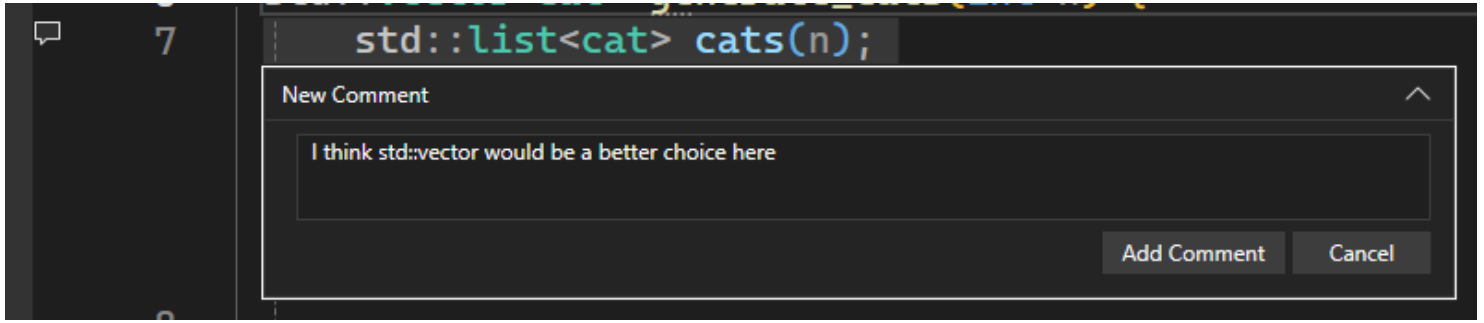
Learn more: aka.ms/vs-collab

Source Control: New Features (17.12 – 17.14)

- Managing renamed files & PR drafts & template improvements
- Internal GitHub repo & multi-repo support
- Write and customize git commit messages
- Improved PR comments and local code reviews
- View outgoing / incoming commits

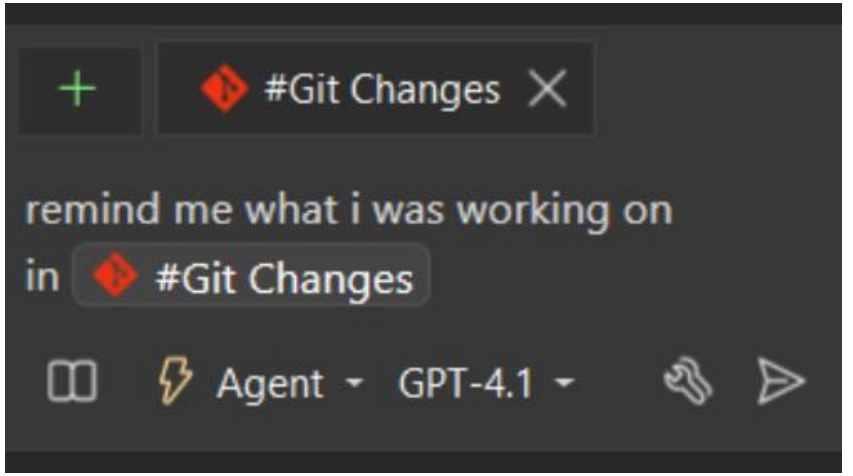






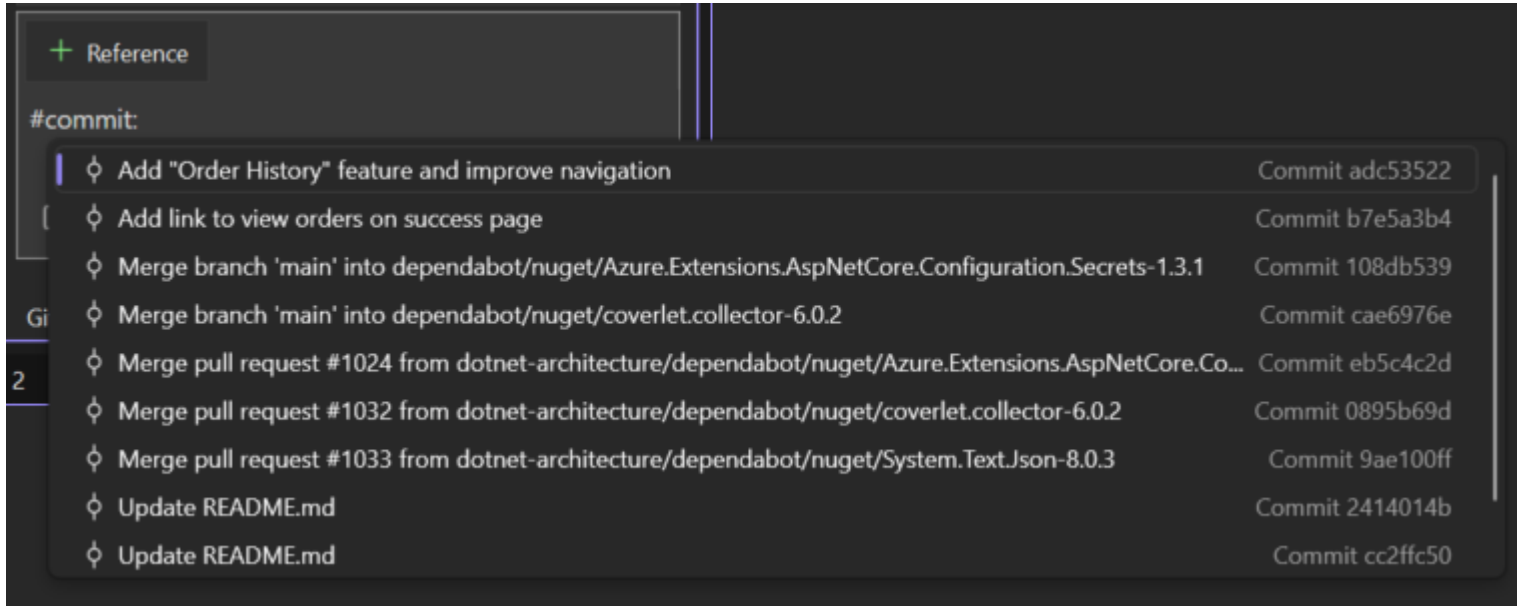
Source Control: New Features (18.0 Insiders)

- **Git context in Copilot Chat:**
  Reference commits and changes in Git Changes window.
  - Ask Copilot to summarize changes, explain commits, and more!



- Review code changes with Copilot improvements

- Inline comments in PR diff view



Microsoft

🚀 Mission of the C++ product team at Microsoft

Empower every C++ developer and their teams to achieve more

- by participating in the creation of the **C++ Standards**
- by investing in the MSVC Build Tools
- by simplifying acquisition in C++ via **vcpkg**
- by improving the **Visual Studio IDE**
- by continuing to enhance the C++ experience for **Visual Studio Code**

Microsoft @ CppCon

https://aka.ms/cppcon/vs

Mon.	16:45	Building Secure Applications: A Practical End-to-End Approach	Chandranath Bhattacharyya & Bharat Kumar
Tues.	09:00	What's new in VS Code: CMake Improvements and GitHub Copilot Agents	Alexandra Kemper
	14:00	What's new in Visual Studio for C++ Developers in 2025	Augustin Popa & David Li
	14:00	Back to Basics: Code Review	Chandranath Bhattacharyya & Kathleen Baker
Wed.	14:00	LLMs in the Trenches: Boosting System Programming with AI	Ion Todirel
	15:15	C++ Performance Tips: Cutting Down on Unnecessary Objects	Kathleen Baker & Prithvi Okade
	15:50	Connecting C++ Tools to AI Agents Using the Model Context Protocol	Ben McMorran
	16:45	Welcome to v1.0 of the meta::[[verse]]!	Inbal Levi
Thurs.	14:00	MSVC C++ Dynamic Debugging: How We Enabled Full Debuggability of Optimized Code	Eric Brumer
	16:45	It's Dangerous to Go Alone: A Game Developer Tutorial	Michael Price
Fri	9:00	Reflection-based JSON in C++ at Gigabytes per Second	Daniel Lemire & Francisco Geiman Thiesen
	13:30	Duck-Tape Chronicles: Rust/C++ Interop	Victor Ciura