

C++ Productivity in Visual Studio 2017

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New User Study

We're running a user study for developers who haven't used Visual Studio before

1 hr of your time here in Redmond...

Get a \$150 Visa gift card for participating!

The Visual Studio family

 Visual Studio

Most complete developer IDE

 Visual Studio Code

Code Optimized Editor

 Visual Studio
Team Services

Cloud services for teams

Best-in-class tools for every developer and every team

Tools and services for any developer, any app



Windows



Linux



iOS



Android

.NET

C++

JavaScript

PHP

Python

Node.js

R

Cordova

Unity

Breaking Down Visual Studio 2017

Acquisition

Performance

Productivity

Breaking Down Visual Studio 2017

Acquisition

Performance

Productivity

New Installation Experience

Installing - Visual Studio Enterprise 2017 RC (15.0.25928.0) ✕

Workloads Individual components Language packs

Windows (3)

- Universal Windows Platform development**
Create applications for Windows 10 with the Universal Windows Platform.
- Desktop development with C++**
Build classic Windows-based applications using the power of MFC, ATL, and the Microsoft C++ toolset.
- .NET desktop development**
Build WPF, Windows Forms and console applications using the .NET Framework.

Web & Cloud (8)

- Web development**
Build web applications using ASP.NET and HTML, JavaScript, and CSS.
- Azure development**
Azure SDK for .NET and tools for developing cloud apps and resources.
- Python development (Preview)**
Editing, debugging, interactive development and source control for Python.
- Node.js development**
Build scalable network applications using Node.js, an asynchronous event-driven JavaScript runtime.
- Data storage and processing**
- Data science and analytical applications (Preview)**

Location: ... Install size: 5.93 GB

Summary

- > Visual Studio core editor
- ∨ Desktop development with C++
 - Included
 - ✓ Visual Studio C++ core features
 - Optional
 - VC++ 2017 v141 toolset (x86,x64)
 - Just-In-Time debugger
 - C++ profiling tools
 - Windows 10 SDK (10.0.14393.0)
 - Visual C++ tools for CMake
 - Windows 8.1 SDK
 - Windows XP support for C++
 - MFC and ATL support (x86 and x64)
 - C++/CLI support
 - Clang with Microsoft CodeGen
 - Windows 10 SDK (10.0.10586.0)
 - Windows 10 SDK (10.0.10240.0)

i By proceeding with this installation, you agree to the [download and license terms](#) for the software you have selected.

Install

C++ Workloads

Pick and choose your C++ scenario!

5 workloads relevant to C++

- Desktop Development with C++ (5.76 GB)
- Linux Development with C++ (1.13 GB)
- Game Development with C++ (5.02 GB)
- Mobile Development with C++ (10.97 GB)
- Universal Windows App Development (8.58 GB)

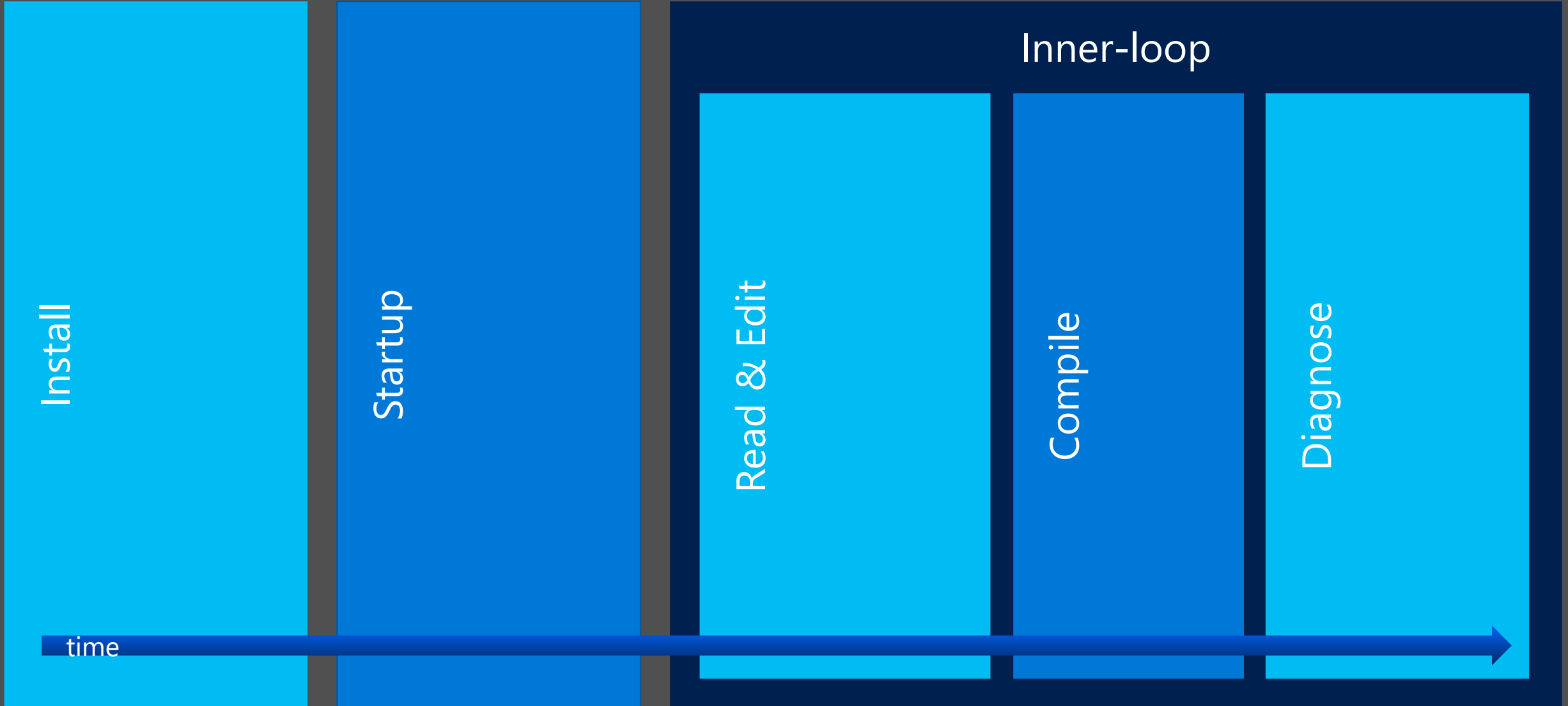
Visual Studio 2017 –Overview

Acquisition

Performance

Productivity

Faster Visual Studio



Faster

Faster Startup Times, Less Memory Usage

Start the IDE in an instant, load your projects in seconds, use less memory

Dramatic improvements in **solution load time (both 1st time and subsequent)**
Substantial reduction in IDE **Private Working Set & Virtual Memory** usage

Chromium - 4600 Solution Items	VS 2015 Update 3	VS 2017	Change
Time - First Solution Open (s)	1,213	182	-85%
Time - Subsequent Solution Open (s)	1,211	68	-94%
Private Working Set (MB)	2,293	804	-65%
Virtual Memory (MB)	3,066	1,302	-58%

aka.ms/vcperf

Install

Startup

Read & Edit

Faster

Install

Startup

Read & Edit

Auto Pre-Compiled Headers (Auto PCH)

Better IntelliSense Responsiveness

Precompiled headers can be used to improve build times and IntelliSense responsiveness. But what if you don't have any?

In VS 2017 **Auto PCH** (on by default) will cache information from #includes for better responsiveness

Fresh IntelliSense information available more quickly after editing a file (when outside of a local function)

SceneCore.cpp from Unreal Engine 4 builds **11x faster**

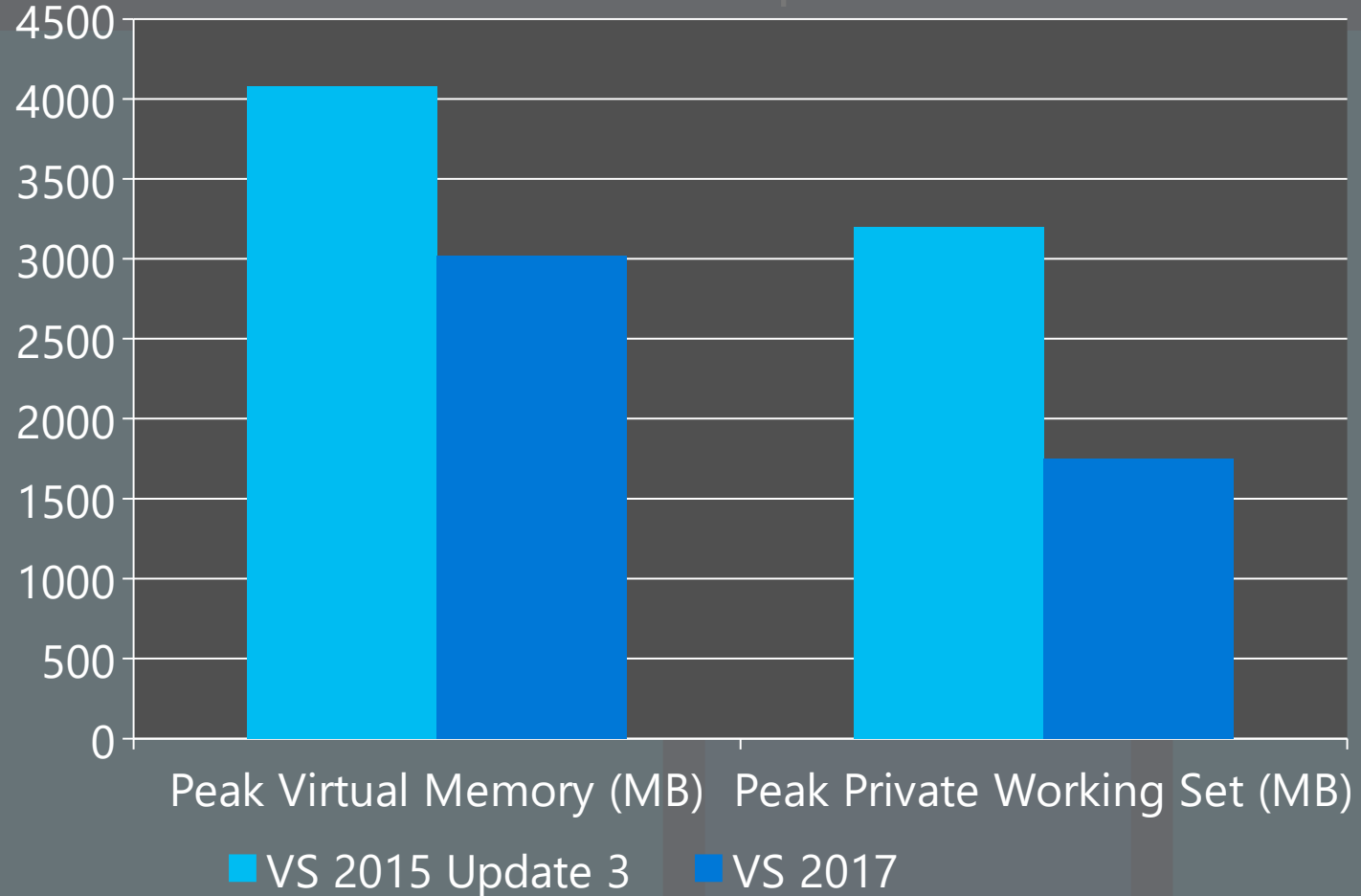
Build time: **1.3s** (previously 14.6s)

Faster

Debugger Memory Reductions

Keep your machine from choking while looking for bugs in your code

Data shown below is for Unreal Engine Inner-loop



aka.ms/vcperf

Faster

Install

Startup

Read & Edit

Build Throughput Improvements

Get faster to debug your code

Faster builds (with improved linking)

Visual Studio 2015 Update 3

When opting for /debug:fastlink (added in VS 2015), 2-4x faster, e.g. Fable, Forza, Chrome, Bing Maps

Standalone tool (mspdbcmf.exe) to generate FULL PDB for binary

Visual Studio 2017

On by default, further improves link times by 30% (over VS2015 U3)

mspdbcmf.exe integrated as part of the Visual Studio build experience

aka.ms/vcperf

Visual Studio 2017 –Overview

Acquisition

Performance

Productivity

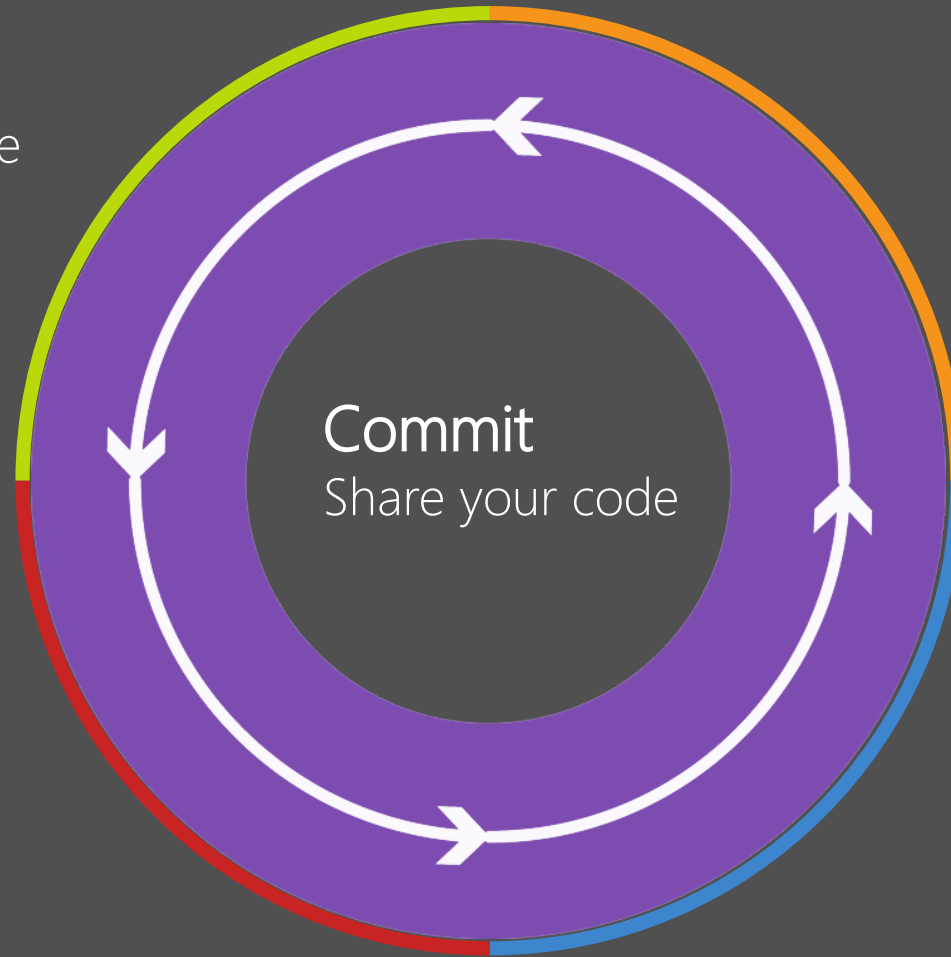
Developer Inner Loop Productivity

Read & Edit

Create and update
your code

Diagnose

Fix and optimize
your code



Compile

Build your code

Test

Validate your
code

Demo

394
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```
static CURLState *curl_init_state(struct curl_slist *headers, struct curl_slist *cookies)
{
    CURLState *state = NULL;
    int i, j;

    do {
        for (i=0; i<CURL_NUM_STATES; i++) {
            for (j=0; j<CURL_NUM_STATES; j++) {
                if (!state[i].act[j])
                    continue;
                if (state[i].in_use)
                    continue;

                state = &state[i];
                state->in_use = 1;
                break;
            }
        }
        if (!state) {
            curl_poll(hdrs_get_all_content(), state);
        }
    } while (1);
}
```

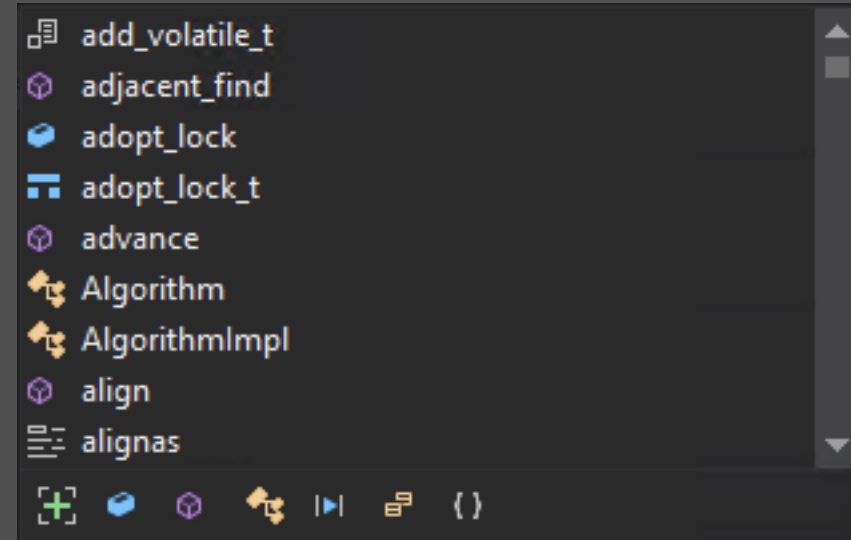
Code Editing & Navigation

IntelliSense

Predictive IntelliSense

- Predictive Scope
- Accessibility Scope
- Text Matching Scope
- No Scope

IntelliSense "Kind" Filters



Expand
Scope
(CTRL + J)

Kind Filters
(variables,
functions,
macros, etc)

Find All References

Filter Results
(available for most columns)

Clear Filter

- (Select All)
- Confirmed (7)
- Disconfirmed (0)
- In comment (6)
- In string (1)
- Unprocessed (0)

Group By...

- Project then Definition
- Definition Only
- Definition then Project
- Definition then Path
- Definition, Project then Path

Sort Results
By any column by clicking it

Distinguish
Reads vs. Writes

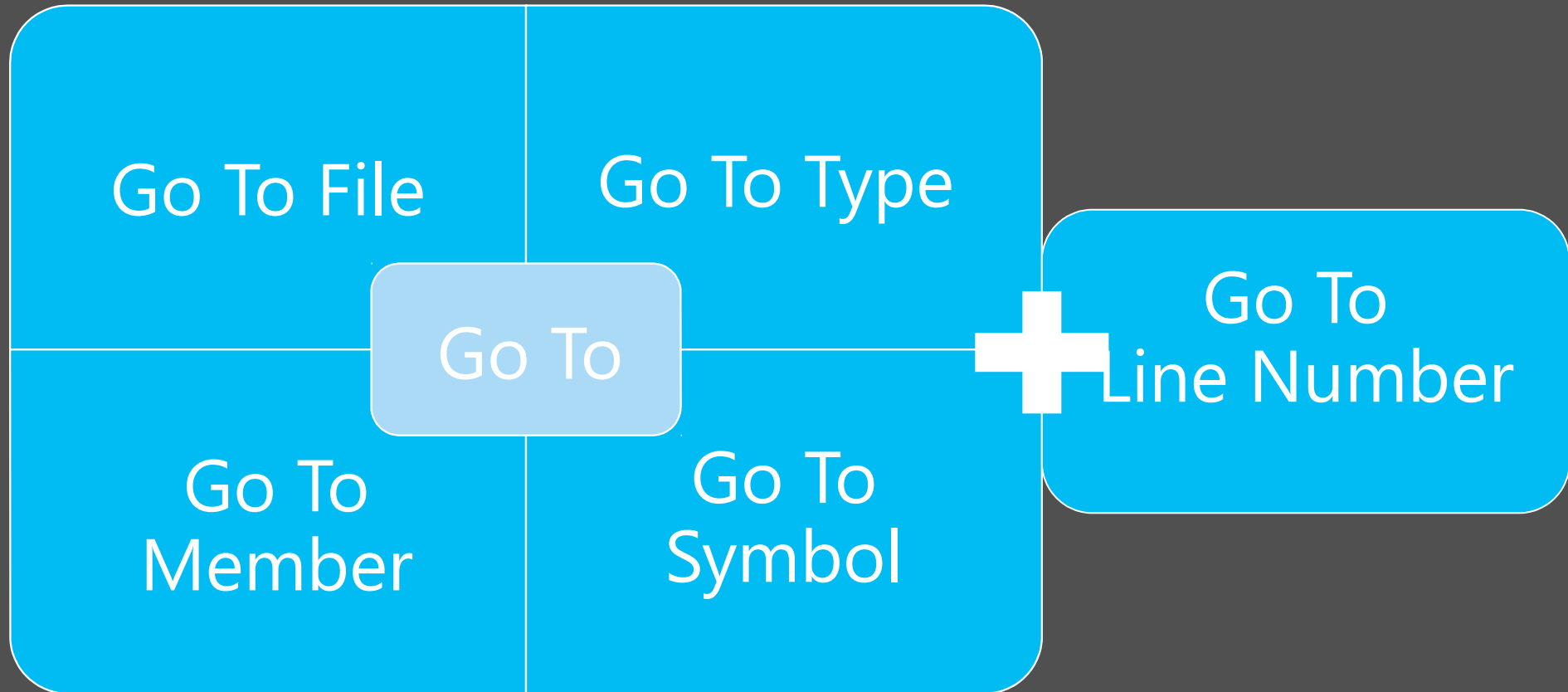
Incremental
Population

Find All References 1 - m_itListCurrent

Entire Solution | Group by: Definition then Project | Keep Results

Code	File	Line	Col	Project	Read/Write
ListIterator ChannelRouteIterator::m_itListCurrent (7)					
cryptdll (7)					
m_itListCurrent = m_cs.m_defaultRoutes.begin();	channels.cpp	104	3	cryptdll	Read
return m_useDefault ? m_itListCurrent == m_itListEnd : m_itMapCurrent == m_itMapEnd;	channels.cpp	126	24	cryptdll	Read
++m_itListCurrent;	channels.cpp	132	5	cryptdll	Read
return m_useDefault ? *m_itListCurrent->first : *m_itMapCurrent->second.first;	channels.cpp	139	25	cryptdll	Read
return m_itListCurrent->second.get() ? *m_itListCurrent->second.get() : m_channel;	channels.cpp	145	10	cryptdll	Read
return m_itListCurrent->second.get() ? *m_itListCurrent->second.get() : m_channel;	channels.cpp	145	43	cryptdll	Read
ListIterator m_itListCurrent, m_itListEnd;	channels.h	84	15	cryptdll	Other

Go To (previously Navigate To)



Go To (previously Navigate To)

The screenshot shows the Go To dialog in Visual Studio Code. The dialog has a search bar at the top with the text "source". Below the search bar is a list of search results. The first result is "Source" with a blue icon. The second result is "Source(BufferedTransformation *)" with a purple icon. The third result is "Source" with a blue icon. The fourth result is "Source" with a blue icon. The fifth result is "source_addr" with a blue icon. The sixth result is "sourceDevice" with a blue icon. The seventh result is "sourceInfo" with a blue icon. The eighth result is "sourceMode" with a blue icon. The ninth result is "sourceModelInfo" with a blue icon.

Annotations point to various features:

- Line Number
- File
- Type
- Member
- Symbol
- Limit to current document
- Include external dependencies
- Search History
- Use preview tab (checked)
- Show details (unchecked)
- Center window (unchecked)

Text filtering now available (just type the symbol followed by space)

And now stays open when you Alt + Tab

Support for .editorconfig

Code style enforcement for teams at any level of your project

```
.editorconfig  ↵ ✕
1  # See http://EditorConfig.org
2  root = true
3
4  [*]
5  trim_trailing_whitespace = true
6
7  [*.{c,cpp,h,idl,cs}]
8  indent_style = space
9  indent_size = 4
10
```

aka.ms/vs2017productivity

editorconfig.org

CMake Support & Open Folder

“Open Folder” for C++

Ideal for non-MSBuild projects

e.g. any github project using CMake, make or other C++ build systems

Easy to get started

`devenv.exe <directory>`

or “File > Open > Folder...” (Ctrl+Alt+Shift+O)

Read & edit C++ code

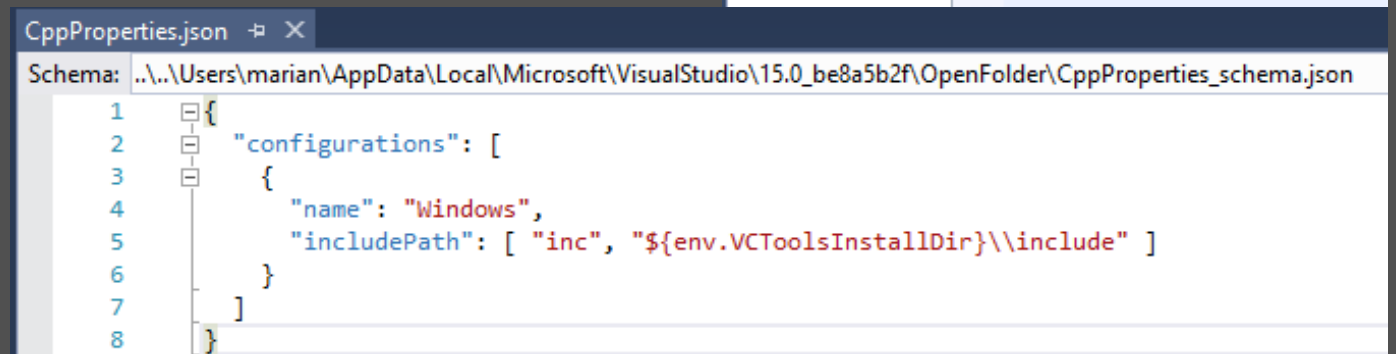
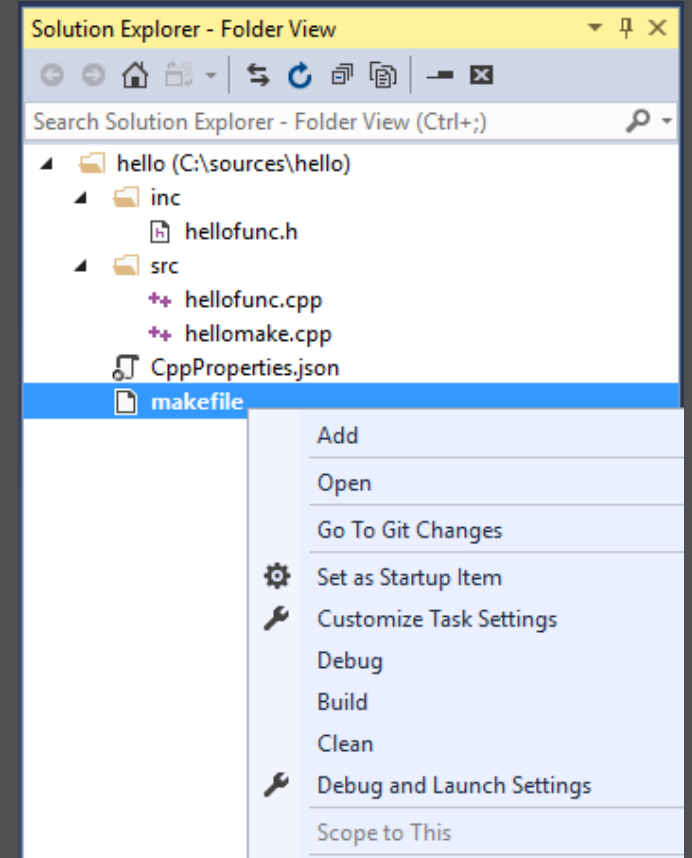
All C++ navigation and IntelliSense features

Build & debug C++ binaries

Flexible integration of external build processes

Familiar Visual Studio C++ debug experience

aka.ms/openfolder/cpp



Tools for CMake

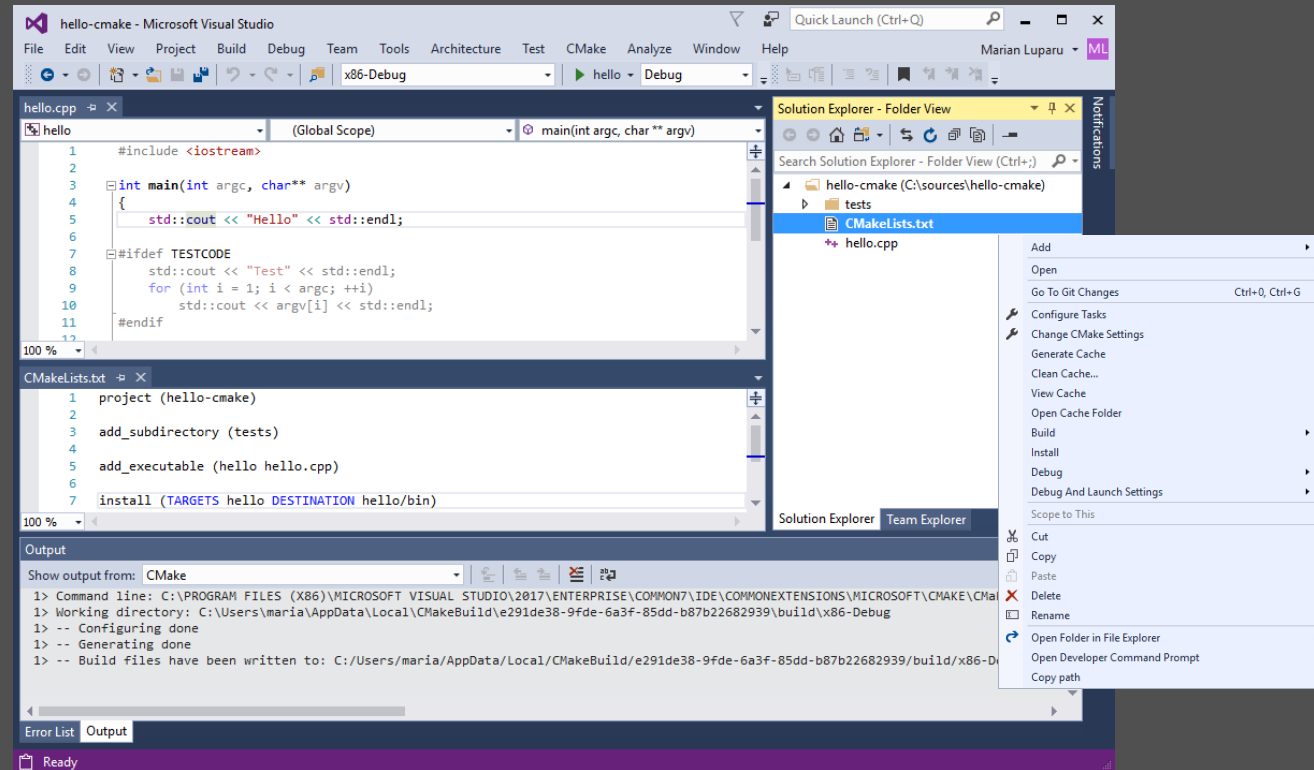
Skip the command line
Open CMake folders directly, no VS solution

CMake-focused experience

Decluttered folder-based view
CMake-specific configuration

CMake-driven environment

C++ code editing, building and debugging



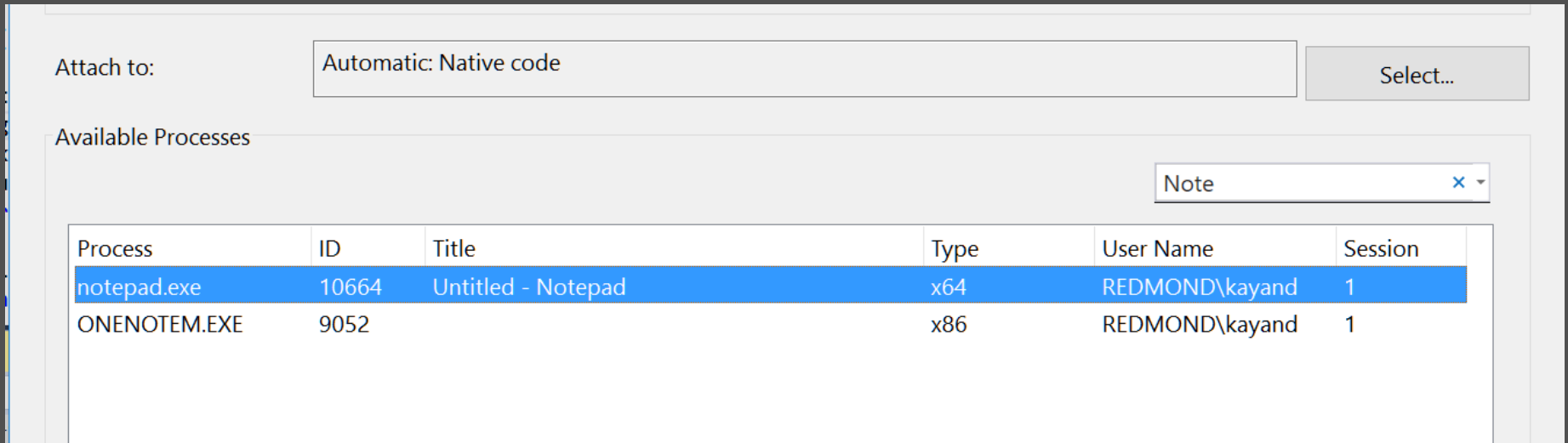
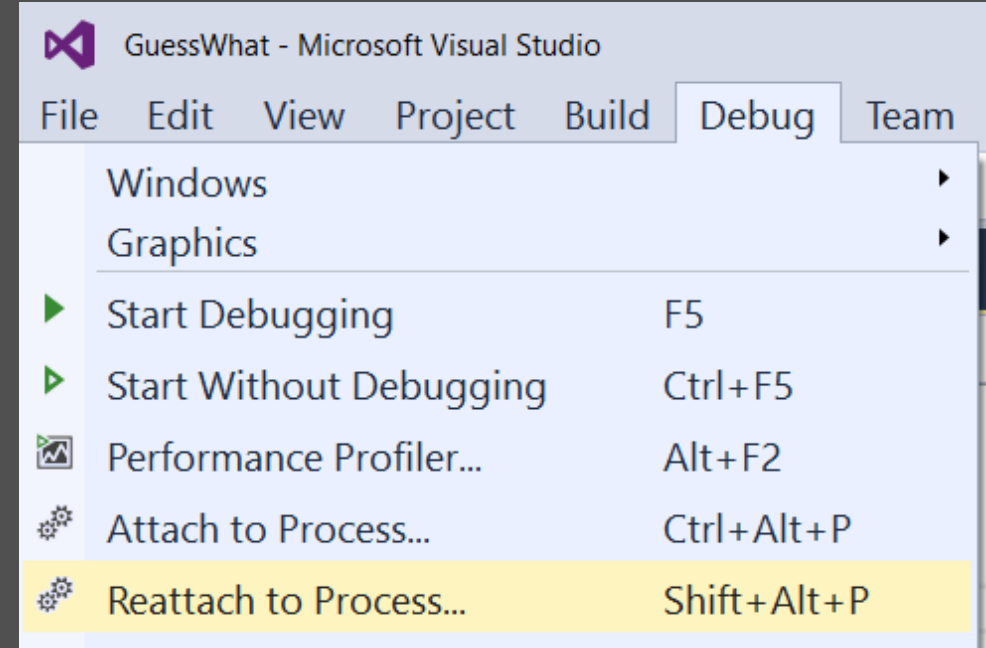
aka.ms/cmake

Debugging / Diagnostics

Reattach to Process

Debug Menu | Reattach to Process...

Filter Search Box in Attach to Process



Run to Click

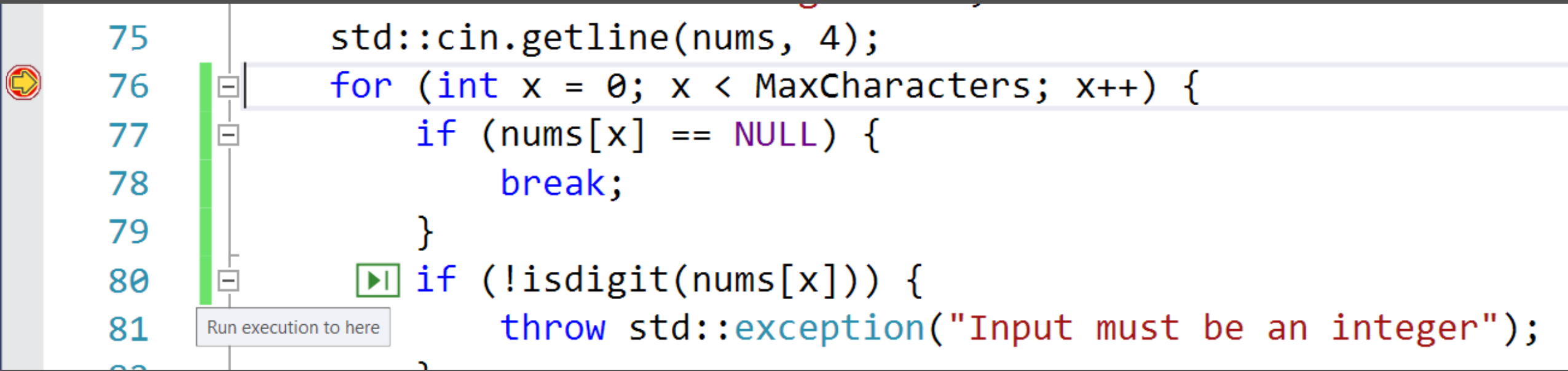
Run to Cursor at the Push of a Button

Hit a Breakpoint while debugging

Click the Glyph

Execution Runs to that line

aka.ms/run2click



```
75     std::cin.getline(nums, 4);
76     for (int x = 0; x < MaxCharacters; x++) {
77         if (nums[x] == NULL) {
78             break;
79         }
80     if (!isdigit(nums[x])) {
81         throw std::exception("Input must be an integer");
82     }
```

Run execution to here

Exception Helper

Non-Modal

Shows what is Null

aka.ms/exceptionhelper

```
61     if (value.is_object())
62     {
63         guess_result->ServerResult->Result = (GuessResult)value.at(L"result").as_integer();
64     }
65     return guess_result;
66 }).get();
67 }
```

```
69 int GetUserGuess() {
70     int number;
71     const int MaxCharacters = 4;
72     char nums[MaxCharacters];
73
74     std::wcout << L"Enter guess: ";
```

Exception Thrown

Exception thrown: read access violation.

guess_result->**ServerResult** was 0xFFFFFFFFFFFFFFFF.

[Copy Details](#)

▶ [Exception Settings](#)

Q & A and More Info

- Visual C++ Blog: aka.ms/visualcpp
- Why you will love Visual Studio 2017: aka.ms/vs2017love

Contact us directly:

- aupopa@microsoft.com
- mluparu@microsoft.com

Let us know if you're a new user and want to participate in a UX study!
\$150 gratuity provided!