GATS Companion: Enabling C++ 20 in Visual C++ 2022

Author: Garth Santor
Editors: Trinh Hān
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Overview

This document will show how to enable C++ 20 features in Visual Studio 2022.

Introduction

Microsoft enables an earlier standard of the language as the default requiring programmers to opt-in to newer standards. Currently, the default is set to `ISO C++ 14`, with opt-ins to the `ISO C++ 17` and `ISO C++ 20` standards. C++ 23 is partially implemented, and those features are found under the setting `ISO C++ latest draft`.

Create a project

Open an existing project or create a new console project. You can implement my demo by creating a C++ console project containing the following code:

```
// TestCpp20_main.cpp
// (c) 2023, Garth Santor
// Confirms that Visual C++ has installed C++ 20 compatibility

#include <iostream>

int main()
{
    std::cout << "Hello, C++ 20!\n\n";

#if __cpp_constinit
    std::cout << "Has C++ 20's constinit feature.\n";
    std::cout << "C++ 20 capable!\n";
#else
    std::cout << "Doesn't have C++ 20's constinit feature.\n";
    std::cout << "NOT C++ 20 capable!\n";
#endif
}

// Run program: Ctrl + F5 or Debug > Start Without Debugging menu
// Debug program: F5 or Debug > Start Debugging menu
```

Build the project

If using our demo code, you'll notice that first part of the `#if` is grayed. This indicates that the `constinit` feature (introduced in C++ 20) is not available. Build and run the project (with the default settings). The output should be as follows.
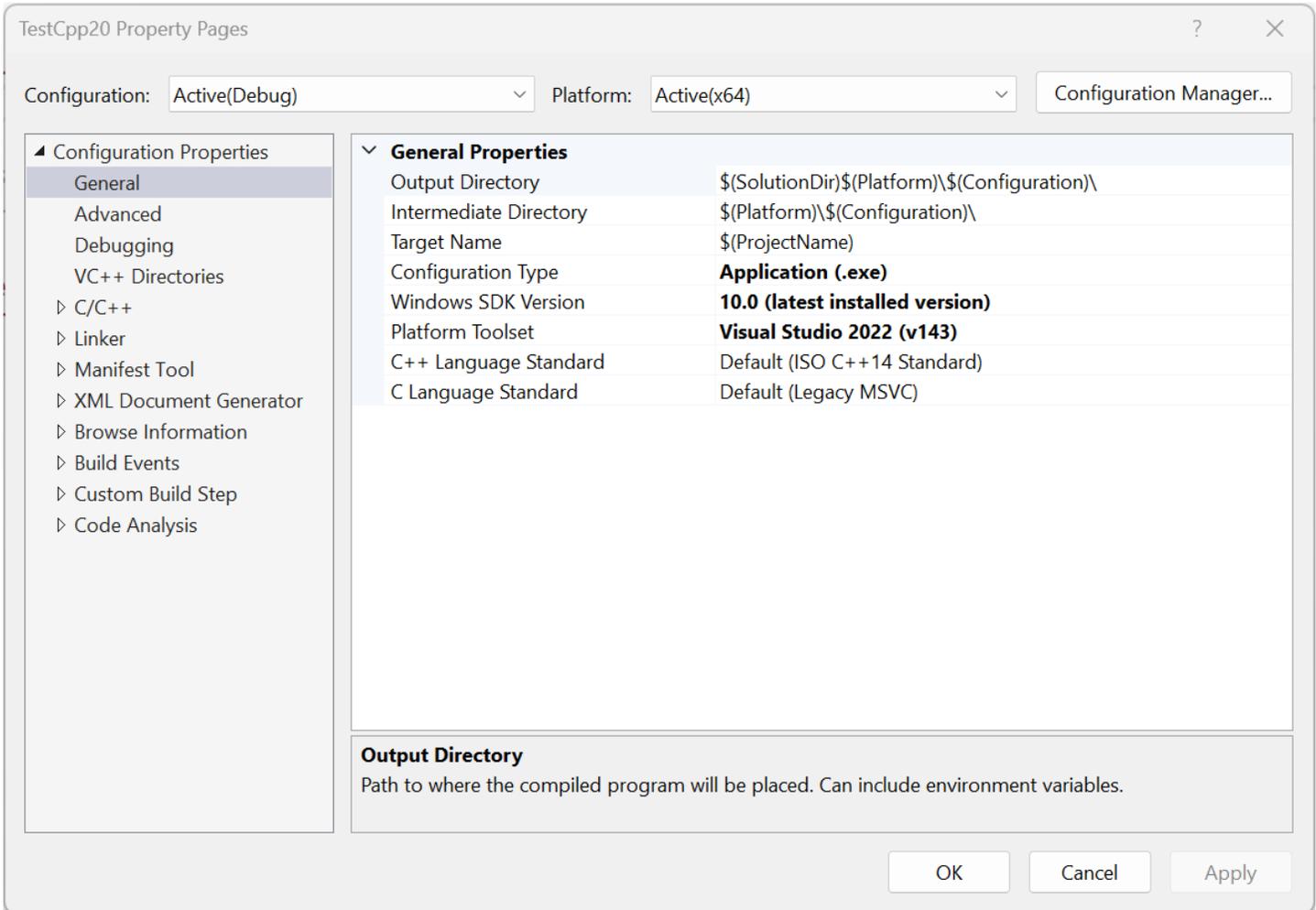
Windows Console

```
Hello, C++ 20!

Doesn't have C++ 20's constinit feature.
NOT C++ 20 capable!
```
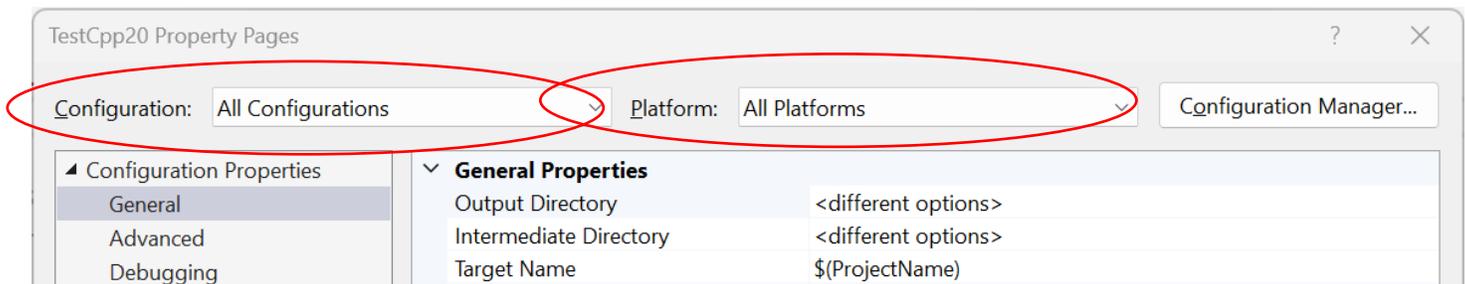
Settings C++ 20

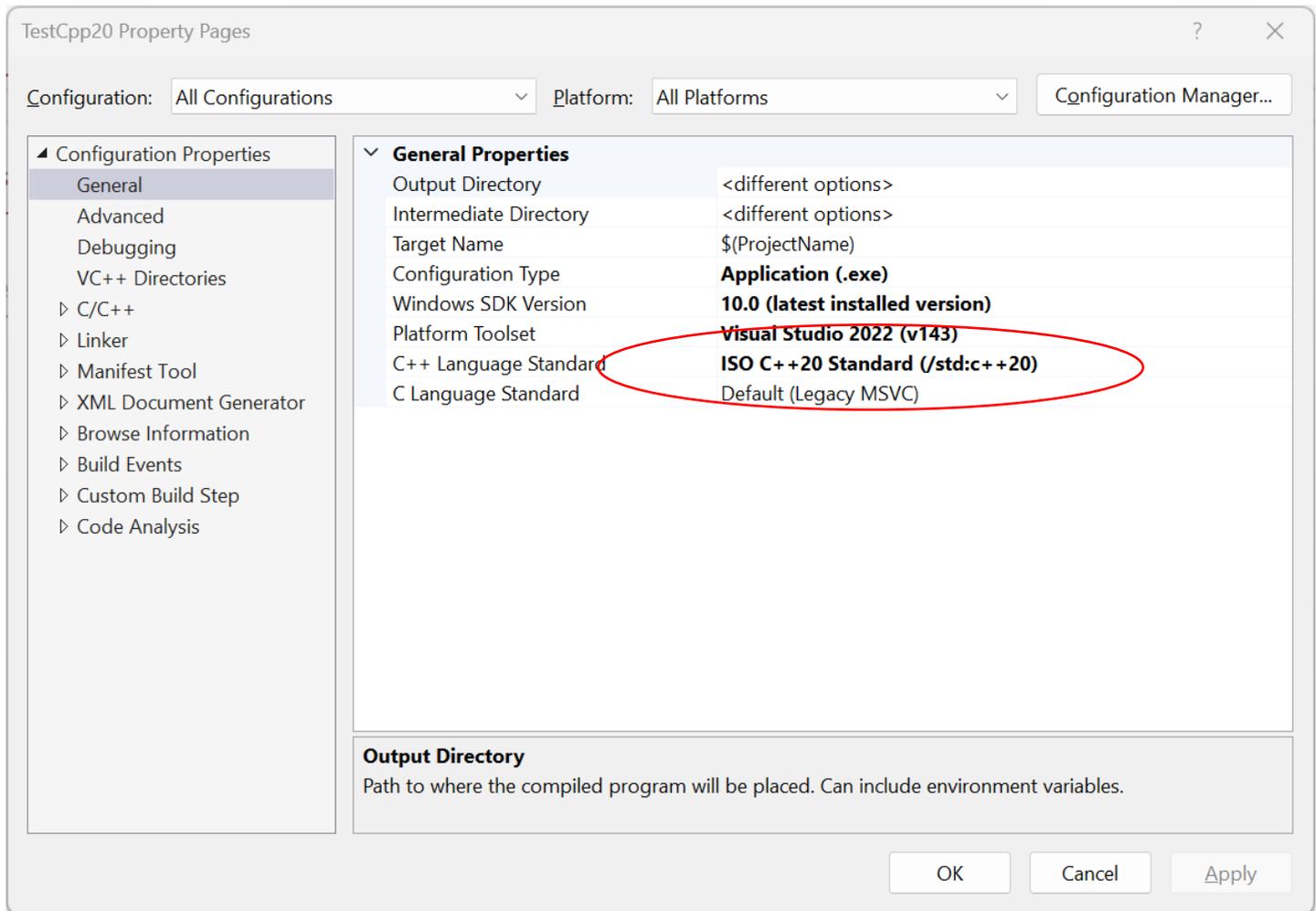Open the project properties (Menu: project → properties).

Note that the configuration and platform are set to the current active settings (unless you've already changed these settings).

Change the configuration to All Configurations, and the platform to All platforms.

Now, you can change the language standard for all configurations on all platforms…

TestCpp20 Property Pages   ?   ✕

Configuration: All Configurations   Platform: All Platforms   Configuration Manager...

▲ Configuration Properties
    General
    Advanced
    Debugging
    VC++ Directories
  ▷ C/C++
  ▷ Linker
  ▷ Manifest Tool
  ▷ XML Document Generator
  ▷ Browse Information
  ▷ Build Events
  ▷ Custom Build Step
  ▷ Code Analysis

∨ **General Properties**

Output Directory	\<different options\>
Intermediate Directory	\<different options\>
Target Name	$(ProjectName)
Configuration Type	**Application (.exe)**
Windows SDK Version	**10.0 (latest installed version)**
Platform Toolset	**Visual Studio 2022 (v143)**
C++ Language Standard	**ISO C++20 Standard (/std:c++20)**
C Language Standard	Default (Legacy MSVC)

Output Directory
Path to where the compiled program will be placed. Can include environment variables.

OK   Cancel   Apply

Build the project

If using our demo code, you'll notice that second part of the `#if` is grayed. This indicates that the `constinit` feature (introduced in C++ 20) is now available. Build and run the project (with the default settings). The output should be as follows.

```
Windows Console
Hello, C++ 20!

Has C++ 20's constinit feature.
C++ 20 capable!
```

From the command line

Open a console in the small folder as your C++ source file.

Execute the commands:

```
> vcvars64↵
> cl /std:c++20 TestCpp20_main.cpp
```

References

Microsoft Visual C++ on Wikipedia
Microsoft Visual Studio on Wikipedia

Document History

Version	Date	Activity
1.0.0	2023-09-08	Initial release.