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# Downloads

You can download the following files concurrently. Once you have downloaded them, follow the “Installation” section instructions.

- Download **Qt/Qt Creator** from <https://www.qt.io/download>. Select “Open source” download.
- Download **Visual Studio Community 2017** from <https://www.visualstudio.com/it/downloads/>.
- Download **Boost** from <http://www.boost.org/users/download/>. Select the Windows version zip archive (for example boost\_1\_66\_0.zip).
- Download **libQGLViewer** from <http://libqglviewer.com/download.html>. Select the Windows version zip archive file (you have to accept license agreement).
- Download **Eigen3** from <http://eigen.tuxfamily.org/>. Get the latest stable version zip archive file. Now the latest stable release is Eigen 3.3.4.
- Download **Windows 10 SDK** (it contains the debugger for MSVC2017 and some utilities) from <https://developer.microsoft.com/en-us/windows/downloads/windows-10-sdk>

Note that you could start installing the required components in any order, except for libQGLViewer and Windows 10 SDK which should be installed in the end. Indeed, **libQGLViewer** needs Qt/Qt Creator and Visual Studio 2017 to be compiled and **Windows 10 SDK** needs Visual Studio 2017 to be installed.

# Installation

## Visual Studio 2017:

Execute the installation .exe file, then open the “Single components” (in italian “Singoli componenti”) tab. Select the following components and proceed with the installation:

### Riepilogo

#### > Editor principale di Visual Studio

#### ✓ Singoli componenti \*

- ☒ .NET Framework 4.6.1 SDK
- ☒ Strumenti per analisi statica
- ☒ Windows 10 SDK (10.0.16299.0) per la piattaforma ...
- ☒ Funzionalità di base di Visual Studio C++
- ☒ Set di strumenti VC++ 2017 versione 141 (x86, x64)
- ☒ Windows 10 SDK (10.0.16299.0) per la piattaforma ...
- ☒ .NET Framework 4.6.1 Targeting Pack
- ☒ Aggiornamento di Visual C++ 2017 Redistributable
- ☒ Windows 10 SDK (10.0.16299.0) per desktop C++ [x...
- ☒ Windows Universal CRT SDK
- ☒ Supporto C++/CLI

## Windows 10 SDK:

Wait for the installation of **Visual Studio 2017**.

Execute the installation .exe file, then select the “Debugging Tools for Windows” component, as shown below.

### Select the features you want to install

Click a feature name for more information.

- ☐ Windows Performance Toolkit
- ☒ Debugging Tools for Windows
- ☐ Application Verifier For Windows
- ☐ .NET Framework 4.7.1 Software Development Kit
- ☐ Windows App Certification Kit
- ☐ Windows IP Over USB
- ☐ MSI Tools
- ☐ Windows SDK Signing Tools for Desktop Apps
- ☐ Windows SDK for UWP Managed Apps
- ☐ Windows SDK for UWP C++ Apps
- ☐ Windows SDK for UWP Apps Localization
- ☐ Windows SDK for Desktop C++ x86 Apps
- ☐ Windows SDK for Desktop C++ amd64 Apps
- ☐ Windows SDK for Desktop C++ arm Apps
- ☐ Windows SDK for Desktop C++ arm64 Apps

#### Windows SDK Signing Tools for Desktop Apps

Size: 4,9 MB

The Windows SDK Signing Tools for Desktop Apps

Estimated disk space required:

416,3 MB

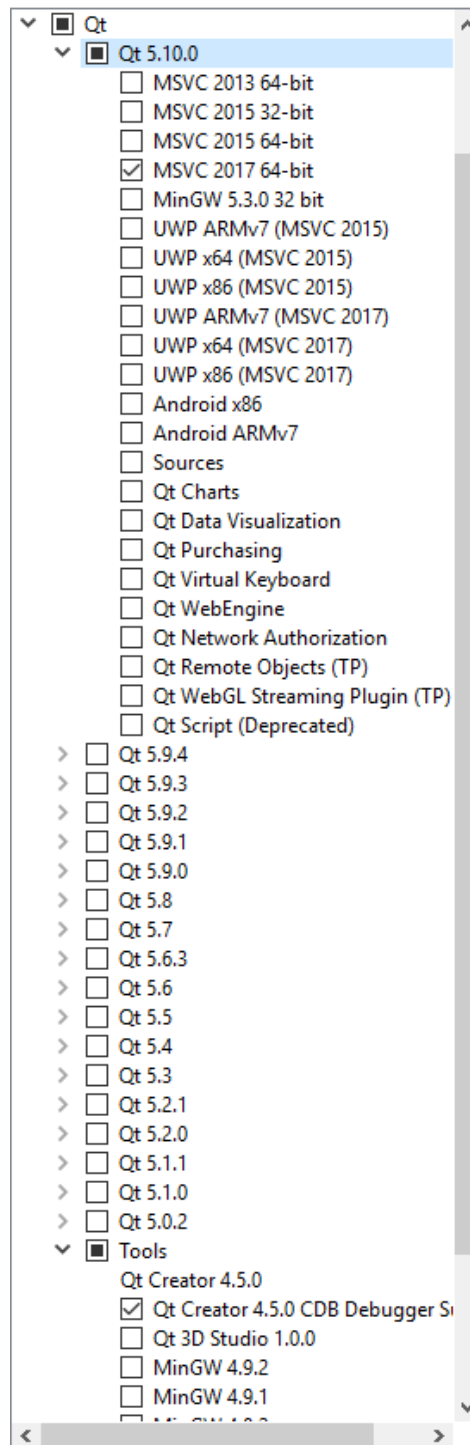
Disk space available:

35,4 GB

## Qt/Qt Creator:

Execute the installation .exe file, choose a installation path with no spaces ("C:\Qt" for example).  
Select the following components and proceed with the installation:

- Qt 5.10.0 > **MSVC 2017 64-bit**
- Tools > **Qt Creator 4.5.0** (you dont have to select it, it is set by default)
- Tools > **Qt Creator 4.5.0 CDB Debugger Support**



### *Boost:*

**BINARIES option, that is the preferred and easiest one:**

**NOTE: you must choose this if you need to install CGAL!**

Download boost binary release for MSVC2017 (you should check it in the readme file) from the sourceforge page <https://sourceforge.net/projects/boost/files/boost-binaries/>: for example "boost\_1\_66\_0-msvc-14.1-64.exe". Run the file and install it in the folder "C:\libs\". If you want to install it in a different path, follow the blue text in section "Compiling the project".

**HEADER-ONLY option:**

**Note: do not choose this option if you need to install CGAL!**

Extract the content of the zip file (boost\_1\_66\_0.zip) in "C:\libs\" and change the directory name to "boost" (that directory must contain the main files of boost, not a directory that contains them). If you want to install it in a different path, follow the blue text in section "Compiling the project".

### *Eigen3:*

Extract the content of the zip file (eigen-eigen-5a0156e40feb.zip) in "C:\libs\" and change the directory name to "eigen3" (that directory must contain the main files of eigen, not a directory that contains them). If you want to install it in a different path, follow the blue text in section "Compiling the project".

### *libQGLViewer:*

Extract the content of the zip file (libQGLViewer-2.7.1.zip) in "C:\libs\" and change the directory name to "libQGLViewer" (that directory must contain the main files of libQGLViewer, not a directory that contains them).

If you want to install it in a different path, follow the blue text in section "Compiling the project".

Wait for the installation of **Qt/Qt Creator** and **Visual Studio 2017**. Follow the instructions in "Qt Creator configuration" section to be sure that Qt Creator can compile a project with MSVC2017: the kit must be the one with the 64-bit compiler MSVC2017 and with the 64-bit debugger CDB.

Once you have installed these two components, open with Qt Creator the project (.pro) file:

"C:\libs\libQGLViewer\QGLViewer\QGLViewer.pro"

Obviously, if you have chosen to install it in a different path, you have to open the correct file. For example the path could be "C:\Programmi\libQGLViewer-2.7.1\QGLViewer\QGLViewer.pro".

Once you have loaded the project, click the button "Configure Project". Build the project with Qt Creator by clicking on the following button, placed in the left-bottom corner of Qt Creator:

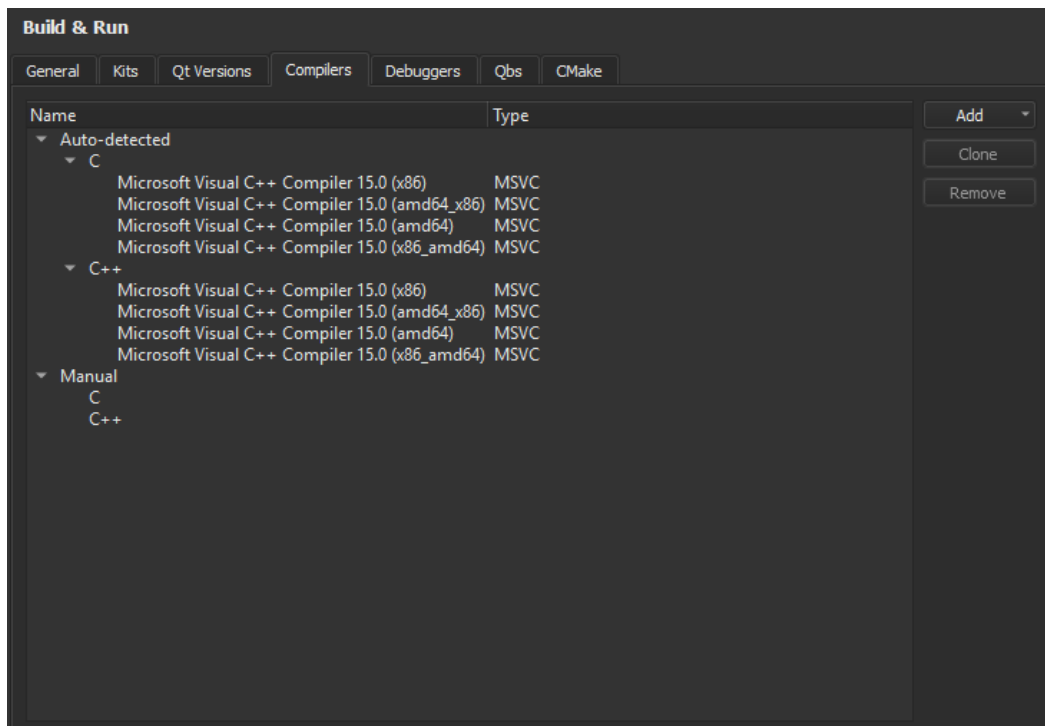
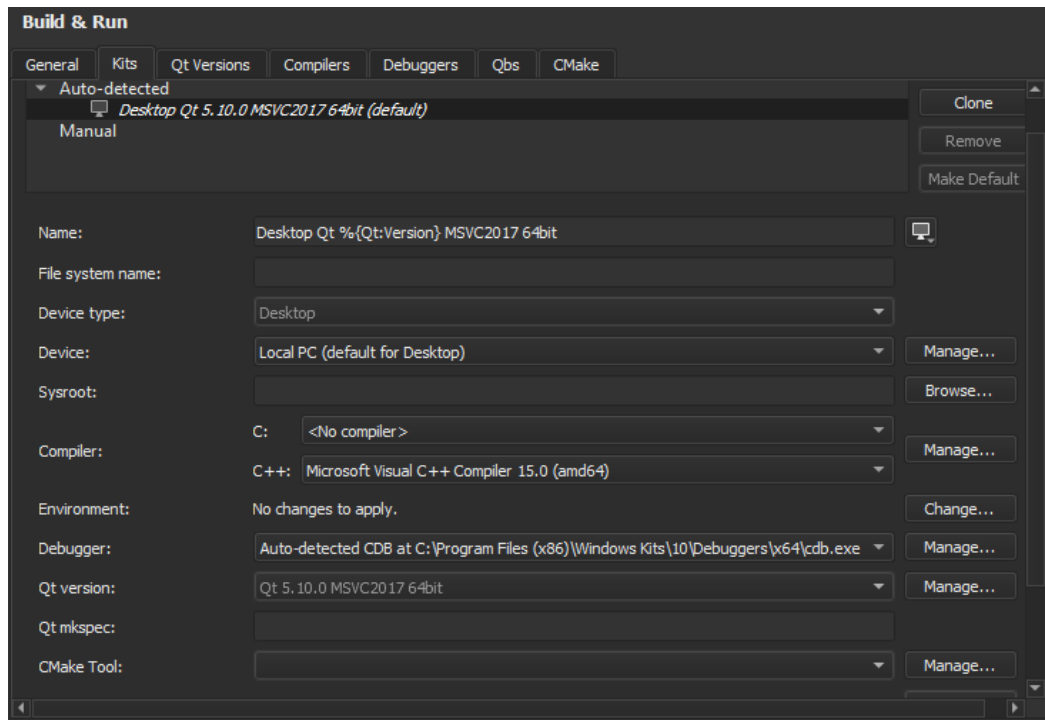


If the build succeeds, then you have correctly installed libQGLViewer.

# Qt Creator configuration

Open Qt Creator. It should **automatically detect MSVC2017 compiler and debugger**. Be careful if you have MinGW or other compiler installed on your computer.

You can check in Options > Tools > Build & Run. In the images shown below, you can find how a configuration should appear in the tab “Kits”, “Compilers” and “Debuggers”.



Build & Run

General

Kits

Qt Versions

Compilers

Debuggers

Qbs

CMake

Name	Location
Auto-detected	
Auto-detected CDB at C:\Program Files (x86)\Windows Kits\10\Debuggers\x86\cdb.exe	C:\Program Files (x86)\Windows Kits\10\Debuggers\x86\cdb.exe
Auto-detected CDB at C:\Program Files (x86)\Windows Kits\10\Debuggers\x64\cdb.exe	C:\Program Files (x86)\Windows Kits\10\Debuggers\x64\cdb.exe
Manual	

Add

Clone

Remove

## Compiling the base project

If you have placed the libraries in the default folders, you do not need to set any environment variable and you can skip the blue text shown below. The default folders for the libraries are:

**C:\libs\libQGLViewer**

**C:\libs\boost**

**C:\libs\eigen3**

In the case you have placed Boost, Eigen or libQGLViewer in different folders than “C:\libs\”, you have to set the following environment variables (you can just set the ones you need, obviously putting your own path of the library):

**QGLVIEWER\_HOME** = C:\Programmi\libQGLViewer-2.7.1

**BOOST\_HOME** = C:\Programmi\boost\_1\_66\_0

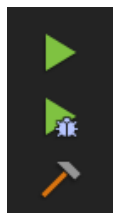
**EIGEN\_HOME** = C:\Programmi\eigen3

You can set the environment variables by adding values to “System variables” form in the window in “My Computer’ properties > Advanced > Environment variables”. You can also access to this window by searching in Windows 10 search bar “Environment variables” (italian: “Variabili di ambiente”) and, once selected the entry in the menu, clicking on the button “Environment variables”.

Run git clone for the repository <https://github.com/cg3hci/cg3libBaseProject>. You should place it in a folder with no spaces in the path (“C:\Workspace\Qt\YourProject\” for example).

Load the project file “cg3libBaseProject.pro” in the project folder (“C:\Workspace\Qt\YourProject\cg3libBaseProject.pro” for example). Click the button “Configure project” (the kit must be the one with the 64-bit compiler MSVC2017 and with the 64-bit debugger CDB).

You can finally execute the base project Clicking “play” button in the bottom-left corner of the IDE (the first one in the following image).



You can test the debugger by clicking the second button in the image above.

Note that, when a process is attached to a debugger, it seems impossible (with this configuration in Windows) to see the standard output (the output in the Qt console/terminal). Try to use the function `qDebug()` instead of `std::cout`, it should work.

If you see that, you have successfully configured your Qt project to run the base project and the basic functions of cg3lib.

With the same configuration you should be able to run also the cg3samples project: <https://github.com/cg3hci/cg3samples>.



# CGAL

For having additional functions, you can install an important computer graphics library: CGAL. Download **CGAL** and **CMake** from <https://www.cgal.org/download/windows.html> and <https://cmake.org/download/>.

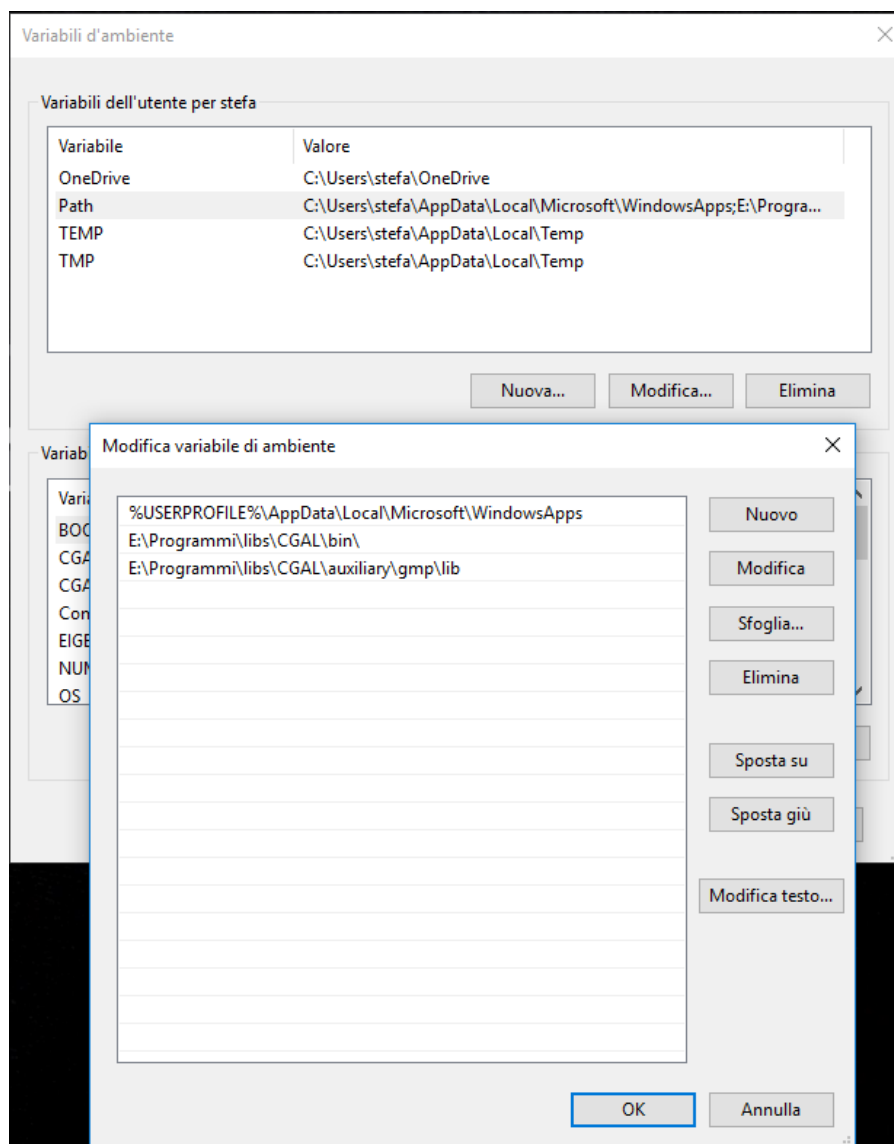
**Note: for installing CGAL you must have followed the BINARIES option in “Installation > Boost” section. In the case you did not followed it, you should delete the header-only boost folder and reinstall it following BINARIES option instructions. Otherwise, you could compile the header-only boost library.**

Run CMake exe file and install it.

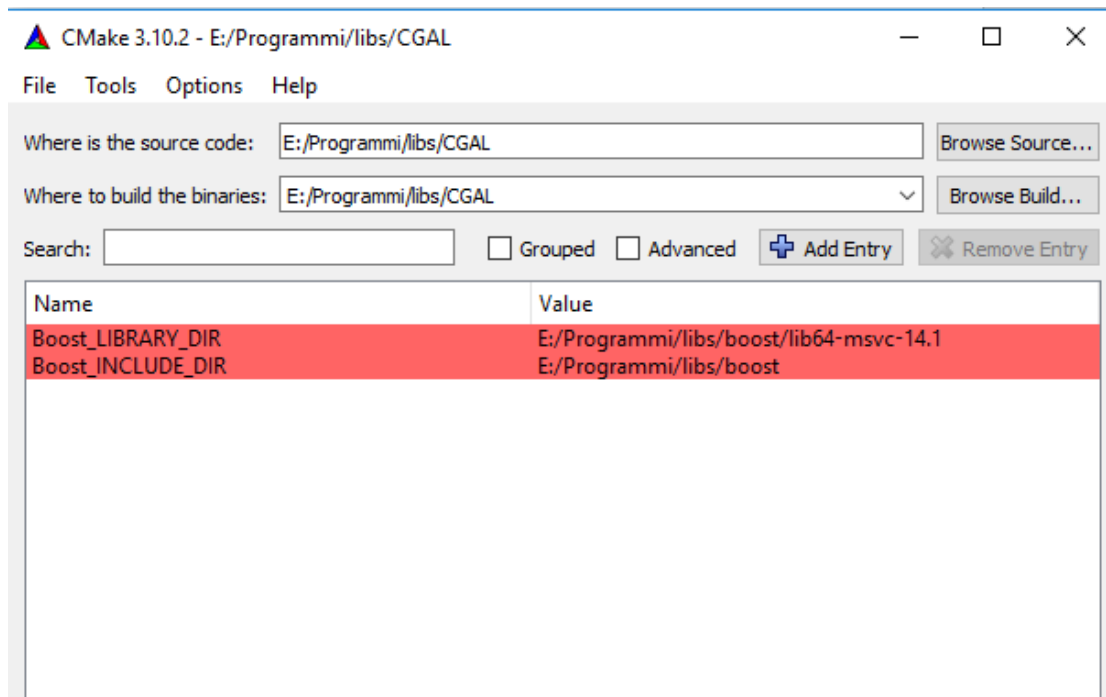
**Obviously, if you want to install it in another path instead of “C:\libs”, use your own one in all the steps.**

Run CGAL exe file: choose the path “C:\libs\CGAL”, choose 64-bit, select “All users” and check the checkbox “CGAL\_DIR” and “Add CGAL/auxiliary/gmp/lib to the PATH”. When finishing the installation, probably an error will be raised because the program could not change the PATH. We have to do it manually, see right below.

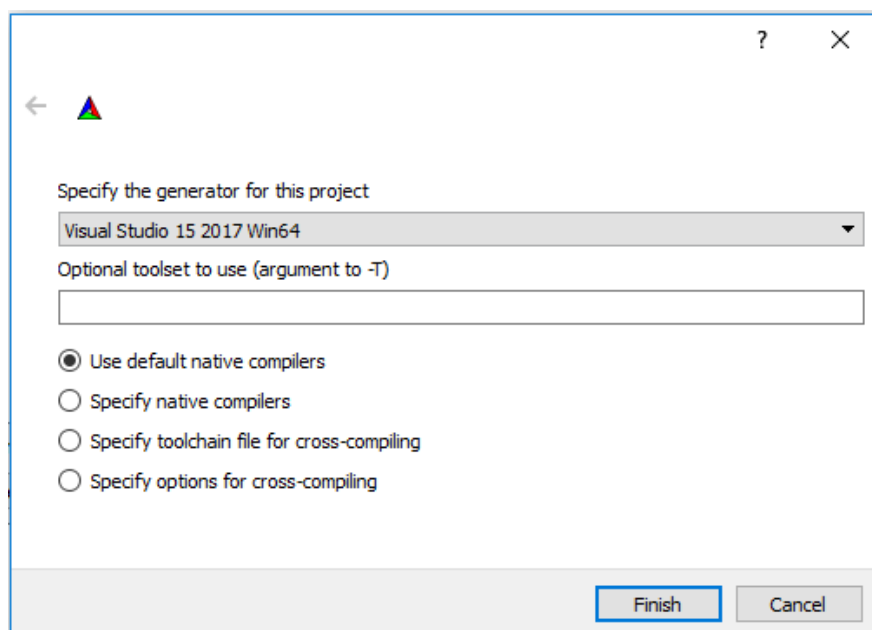
Add to the “PATH” environment variable (user form), as shown in the image below, the following entries:  
**C:\libs\CGAL\bin** and **C:\libs\CGAL\auxiliary\gmp\lib**.



1. Open CMake (the GUI) and set:
  - "Where is the source code" <- "C:/libs/CGAL"
  - "Where to build the binaries" <- "C:/libs/CGAL"
2. In CMake, add the following entries, as shown in the image below:
  - **Boost\_INCLUDE\_DIR** = "C:/libs/boost"
  - **Boost\_LIBRARY\_DIR** = " C:/libs/boost/lib64-msvc-xx.0" (for example lib64-msvc-14.1)

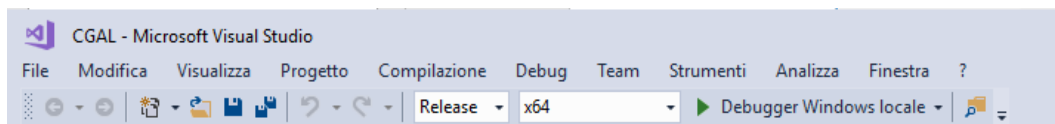


3. Click the button "Configure" and, when asked, select the generator "Visual Studio 15 2017 Win64" with the option "use native compilers".



When you click finish, you should wait for the configuration to be done: “Configuring done” is the message you should expect at this point.

4. Click "Generate" (do not worry about the red lines in CMake, the important thing is that you have in the output “Generation done”).
5. Open the file “C:\libs\CGAL\CGAL.sln” with Visual Studio 2017. Build the project **ALL\_BUILD** both in **Debug** and **Release** mode. You can find the selector in the toolbar:



If everything went fine, you will get, for both the builds, the message:

===== Compilazione: 5 completate, 0 non riuscite, 0 aggiornate, 4 ignorate =====

Note: if you want the working examples and other CGAL functionalities, you could put CMake entries for Eigen3, QGLViewer and Qt.

In the case you have placed CGAL in a different folder than “C:\libs\”, you have to set the following environment variable:

**CGAL\_HOME** = C:\Programmi\CGAL-4.10.2

Try to compile the project. If it does not compile, **verify in cgal.pri that the library names (Boost and CGAL) are the same that have been obtained by building the Boost and CGAL projects**. Indeed the names of the compiled libraries could be different if compiled with different versions of MSVC/Boost/CGAL.

When compiled with MSVC2017 (vc141), boost 1.66.00, CGAL 4.10.2, you get the following compiled libraries:

- **CGAL-vc140-mt-gd-4.10.2.lib** (DEBUG)
- **CGAL-vc140-mt-4.10.2.lib** (RELEASE)
- **boost\_system-vc141-mt-gd-x64-1\_66.lib** (DEBUG)
- **boost\_log-vc141-mt-gd-x64-1\_66.lib** (DEBUG)
- **boost\_thread-vc141-mt-gd-x64-1\_66.lib** (DEBUG)
- **boost\_system-vc141-mt-x64-1\_66.lib** (RELEASE)
- **boost\_log-vc141-mt-x64-1\_66.lib** (RELEASE)
- **lboost\_thread-vc141-mt-x64-1\_66.lib** (RELEASE)

If you use other compiler versions, you should have to change the names of the libraries in the cgal.pri file.

## Notes

If you find any error in this installation guide, please send an email to [stefano.nuvoli@gmail.com](mailto:stefano.nuvoli@gmail.com).