

Geant4 Installation

Davide Chiappara
University of Padova (UNIPD)
Istituto Nazionale di Fisica Nucleare (INFN)

Installation process

- 1) **Check** that you meet all the **requirements**
- 2) **Download** Geant4 **source code**
- 3) **Configure** the build using **CMake**
- 4) **Make** & **install**
- 5) **Configure** your **environment** to use Geant4

Supported platforms and requirements

Operating system:

- “recent” Linux (e.g. Centos 7/8/9) **best support**
- macOS 10.10+
- Windows 7+ (**limited support, not recommended**)

Compilers

- C++11 compliance
 - such as Gcc 8+, clang 12+, Visual C++ 2019+

Cmake (Configuration generation tool): 3.16+

System libraries (**as development packages**):

- CLHEP, expat, zlib

Virtual machine:
Centos7 with **gcc 8.3.1**

These may or may not be necessary. Just remember system libraries if installation fails.

Cmake Installation (if not provided)

Depending on the OS installation, CMake may not be installed by default.

In that case, you have to install it:

- **Linux:** it is recommended to use the CMake provided by the package management system of your distribution.

If version 3.16+ is not available:

1. **download** the latest version (<http://www.cmake.org/>)
2. **unzip** the tarball
3. **./bootstrap, make, make install**

- **macOS:** install it using the Dawring64 dmg installerpackage
- **Windows:** install it using the Win64 exe installerpackage

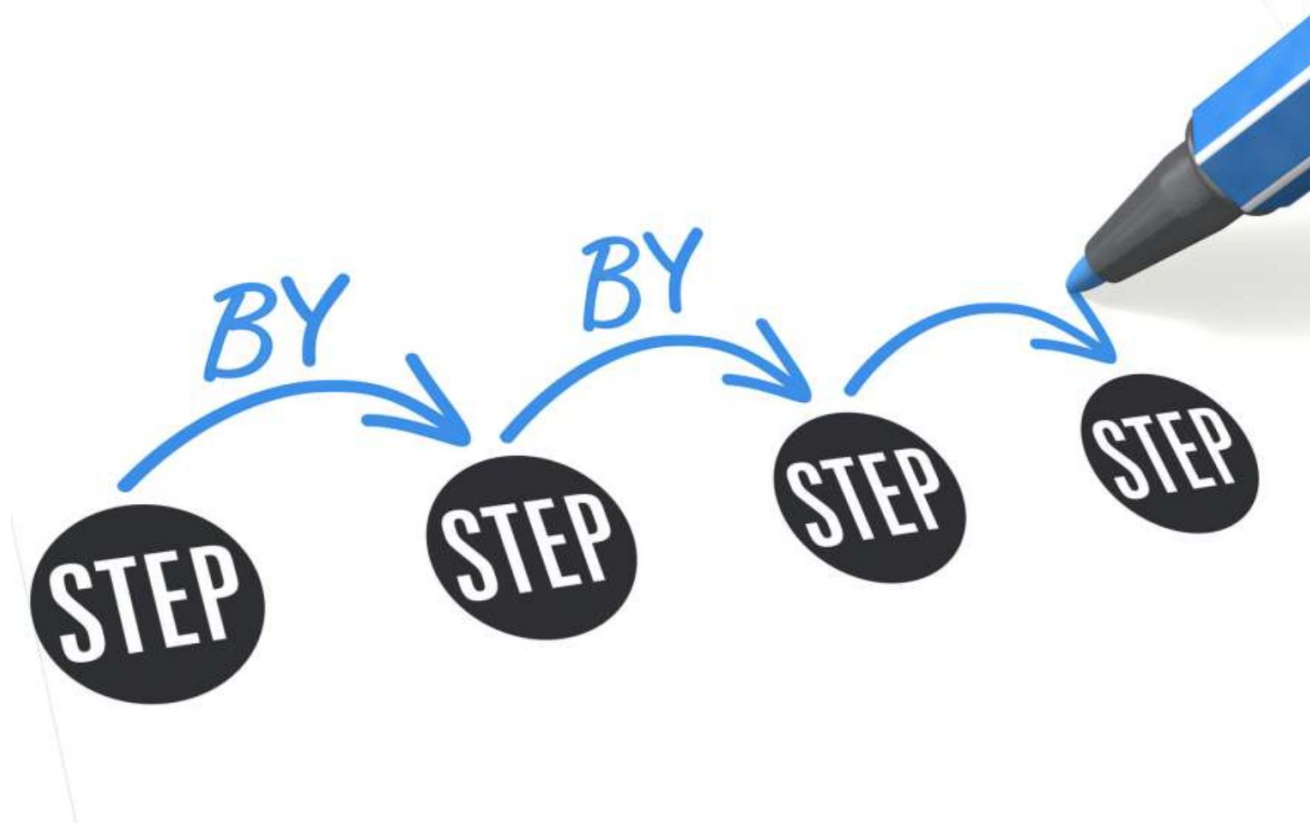
Optional libraries

- **X11** for simple graphical user interface and ray-tracing
- **OpenGL** for visualization
- **Qt4** or **Qt5** for graphical user interface
- **ROOT** for data analysis (even inside Geant4)

Less frequently used libraries/tools:

Motif, OpenInventor, DAWN, RayTracer X11, HepRApp, WIRED JAS Plug-in, AIDA, VRML browser, (external) CLHEP, Wt, ...

and now.... we can proceed with the Geant4 installation



Geant4 Installation

Download the code

Geant4
Toolkit for the simulation of the passage of particles through matter. Its areas of application include high energy, nuclear and accelerator physics, as well as studies in medical and space science.

Getting started

Get started | **Download** | Docs | News

Download
Geant4 source code and installers are available for download, with source code under an open source license.

Latest: 11.1.1

About us | Collaboration | Contribute

Home > Download > Download Geant4-11.1.1

Download Geant4-11.1.1

First released 13 Feb 2023 [All releases](#)

License
See the license conditions.

RELEASE NOTES
See:
[Main Release Notes - Patch-1 -](#)

Source code
Source code is freely available from CERN GitLab or through GitHub.
Source code can also be browsed through the LXR source code browser.

[Download zip](#) [Download tar.gz](#) [Download tar.bz2](#) [Download tar](#)

Binary releases

Download tar.gz	MacOS Ventura, clang-14.0.0
Download tar.gz	Linux CentOS8, g++-8.5.0
Download exe	Windows 10, Visual Studio Code-17.4
Download zip	Windows 10, Visual Studio Code-17.4

<https://geant4.web.cern.ch/>

Extract the file

```
$ cd Downloads  
$ tar -xzf geant4-v11.1.1.tar.gz
```

Create the environment

Geant4 folder

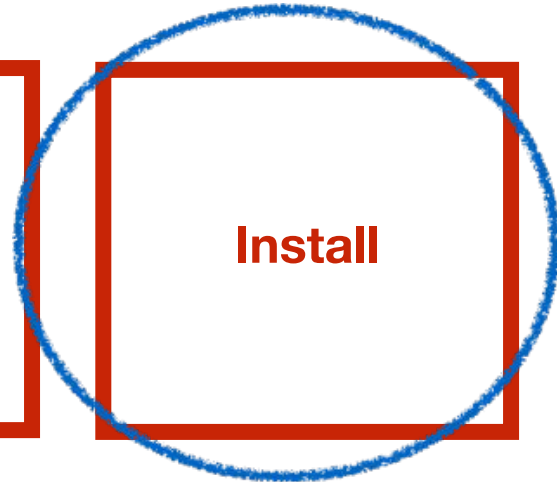
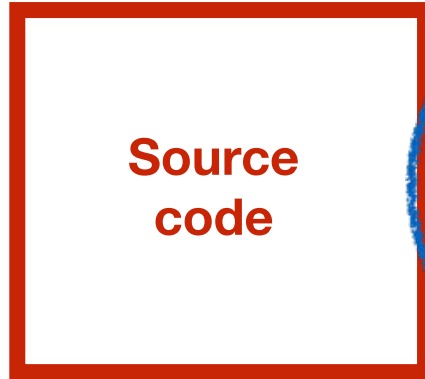
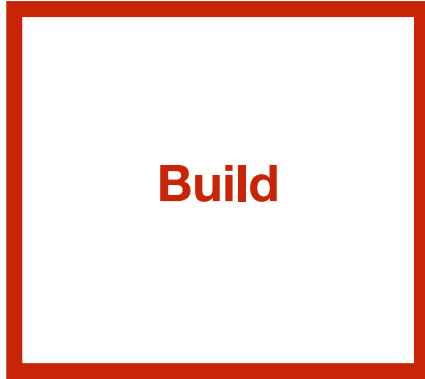
Build

**Source
code**

Install

Create the environment

Geant4 folder



Automatically created

Copy the source code

Choose a path for your installation

```
$ cd Desktop
```

Create a new directory

```
$ mkdir Geant4  
$ cd Geant4
```

Copy the source code in the new directory

```
$ cd /home/user/Downloads  
  
$ cp -r geant4-v11.0.1 /home/user/Desktop/Geant4
```

Copy the source code

Choose a path for your installation

```
$ cd Desktop
```

Create a new directory

```
$ mkdir Geant4  
$ cd Geant4
```

Copy the source code in the new directory

```
$ cd /home/user/Downloads  
$ cp -r geant4-v11.0.1 /home/user/Desktop/Geant4
```

What?

Where?

Prepare the environment

Create the folder build

```
$ cd /home/user/Desktop/Geant4  
$ mkdir geant4-v11.1.1-build  
$ cd geant4-v11.1.1-build
```

Configure the compilation

```
$ cmake  
DCMAKE_INSTALL_PREFIX=/home/user/Desktop/Geant4/geant4-  
v11.1.1-install -DGEANT4_INSTALL_DATA=ON  
-DGEANT4_USE_OPENGL_X11=ON -DGEANT4_USE_QT=ON  
/home/user/Desktop/Geant4/geant4-v11.1.1
```

Prepare the environment

set the *install directory*

the directory under which the Geant4 libraries, headers and support files will be installed.

the additional external data libraries are automatically downloaded

Configure the compilation

```
$ cmake  
DCMAKE_INSTALL_PREFIX=/home/user/Desktop/Geant4/geant4-  
v11.1.1-install -DGEANT4_INSTALL_DATA=ON  
-DGEANT4_USE_OPENGL_X11=ON -DGEANT4_USE_QT=ON  
/home/user/Desktop/Geant4/geant4-v11.1.1
```

build the X11 OpenGL
visualization driver

build the Qt visualization driver

Other options

Important options:

- DCMAKE_INSTALL_PREFIX= ... installation_path
- DGEANT4_INSTALL_DATA=ON/OFF
- DGEANT4_BUILD_MULTITHREADED=ON/OFF

Further options:

- DGEANT4_USE_OPENGL_X11=ON/OFF
- DGEANT4_USE_QT=ON/OFF

.....

<https://geant4-userdoc.web.cern.ch/UsersGuides/InstallationGuide/html/installguide.html#geant4-build-options>

Geant4 installation

Start the Geant4 compilation and install

```
$ make -jN  
$ make install
```

and
wait....

```
[ 0%] Built target G4EMLOW  
[ 0%] Built target G4ND  
[ 1%] [ 1%] Built target G4NEUTRONXS  
[ 1%] [ 1%] [ 1%] [ 1%] Built target RealSurface  
[ 2%] Built target Phototransparency  
Built target G4PFI  
Built target PhotonEvaporation  
Built target G4SAIDATA  
Built target G4SLIB  
[ 4%] Built target G4Global  
make[2]: *** Pas de règle pour fabriquer la cible « /usr/lib/x86_64-linux-gnu/libG4.so », nécessaire pour « outputs/library/Linux-g++/libG4Izps  
_so ». Arrêt.  
make[1]: *** [source/visualization/external/g4Izps/Makefiles/G4Izps.dir/all] Erreur 2  
make[1]: *** Attente des tâches non terminées....  
Scanning dependencies of target G4Intercoms  
[ 4%] [ 4%] [ 4%] [ 4%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UITaskList.cc.o  
[ 4%] [ 4%] [ 4%] [ 4%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UICommandVector.cc.o  
Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UIBatch.cc.o  
Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UICommandTable.cc.o  
Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UICommandTableAndUnit.cc.o  
[ 4%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UICommandTableable.cc.o  
[ 4%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UICommandString.cc.o  
Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UICommandParameter.cc.o  
[ 4%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UICommandInteger.cc.o  
[ 4%] [ 4%] [ 4%] [ 4%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UICommandFree.cc.o  
Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UICommandMessenger.cc.o  
Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UIManager.cc.o  
Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UIRegistry.cc.o  
Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UIMessenger.cc.o  
[ 5%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UIParameter.cc.o  
[ 5%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UISession.cc.o  
/home/bellay/software/geant4/geant4.9.0.p03/source/Intercoms/src/G4UIControlMessenger.cc: In member function 'virtual void G4UIControlMessenger:  
SetNewValue(G4UICommand*, constString)':  
/home/bellay/software/geant4/geant4.9.0.p03/source/Intercoms/src/G4UIControlMessenger.cc:328:121: warning: ignoring return value of 'int system(  
const char*)', declared with attribute warn_unused_result [-Wunused-result]  
    system(newValue);  
[ 5%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UnitsMessenger.cc.o  
[ 5%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4UnitsPart5InitializationManager.cc.o  
[ 5%] [ 5%] Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/G4GenericMessenger.cc.o  
Building CXX object source/Intercoms/Makefiles/G4Intercoms.dir/src/Global.cc.o  
Linking CXX shared library ../outputs/library/Linux-g++/libG4Intercoms.so
```

each time you open a new shell **remember** to source the **geant4.sh** script before executing an application !!!

**Okay
that's all.**