CompuCell3D

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Building CompuCell3D on FedoraCore Linux

Building CompuCell3D from source on Unix/Linux systems is fairly straightforward once all of it's dependencies have been satisfied. The following commands should build and install CC3D on FedoraCore systems.

Prerequisites

Hardware

CompuCell3D may build and run with less capable hardware, but has been tested with the following:

- 1024MB RAM
- Hardware 3D Graphics Acceleration (most modern graphics cards)

Build Tools and Dependencies

In addition to the common Unix/Linux build tools, interpreters and, libraries, building and running CompuCell3D requires:

- Qt (version 4.6 or higher recommended)
- PyQt (with OpenGL modules)
- SWIG (version 2.x recommended)
- VTK (with Python wrappers, version 5.4 or higher recommended)
- Qwt (and PyQwt, version 4.2 or higher recommended)
- QScintilla (version 1.7 or higher recommended)
- CMake (CMake-GUI is recommended)
- Python (version 2.6 or higher recommended)

On Fedora-based distributions the following command should install all the required dependencies (make sure you are **root** before executing yum commands. Othrwise you will geet notification abuot insufficient priviliges):

```
yum install qt4-devel PyQt4 vtk-devel vtk-qt qwt-devel qwt5-qt4-devel PyQwt-devel swig qscintilla-devel cmake-gui
PyOpenGL vtk-python python2-devel libxml2-devel qscintilla-python gcc-c++ git
```

Source Code

Once the dependencies have been satisfied make directory where you want to store source code, in my case it is in **/home/m/CC3D_GIT**

```
mkdir /home/m/CC3D_GIT
cd /home/m/CC3D_GIT
```

Once the directory has been created, obtain the source code from our GIT repository using the following command:

```
git clone  https://github.com/CompuCell3D/CompuCell3D.git .
```

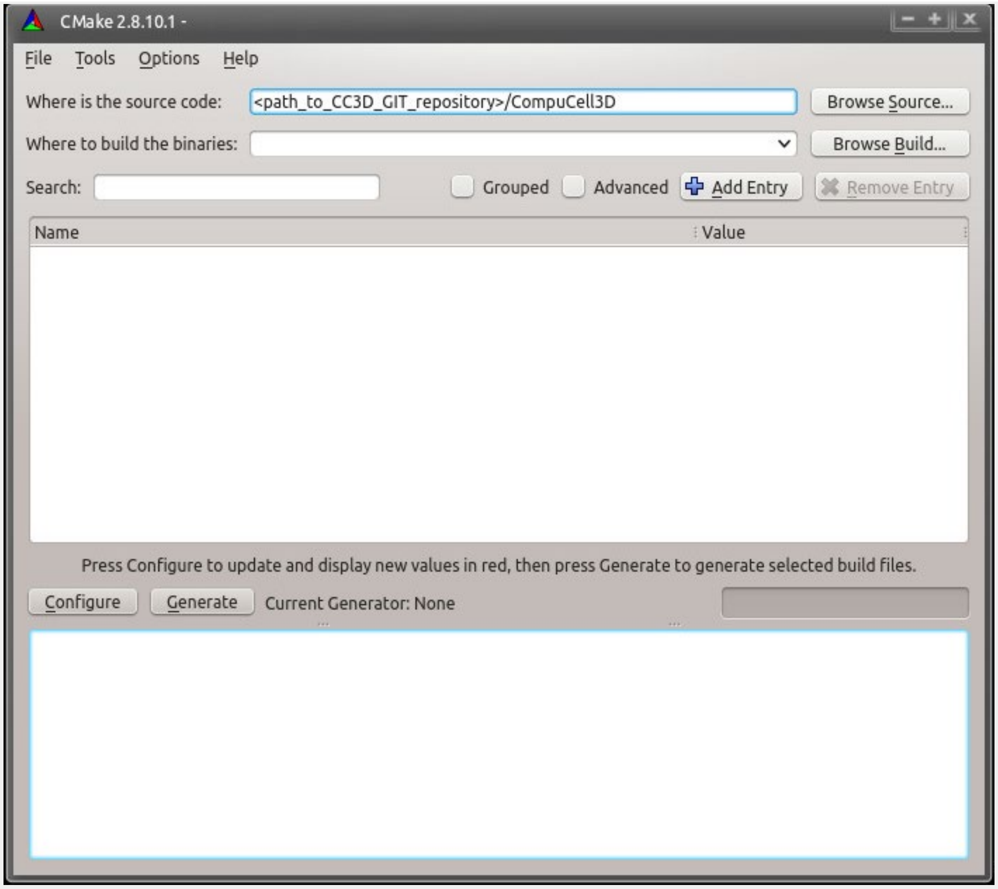
This will clone CC3D Git repository into current directory (remember about the **.** at the end of last command - it is important)

Build Configuration: Starting CMake

CompuCell3D is configured using the CMake build system. The following command starts the CMake GUI:

```
cmake-gui
```

That will start the build system, click `Browse Source...` and select the **CompuCell3D** source directory from the CompuCell3D GIT directory we have created above - in my case the CompuCell3D source directory is located in **/home/m/CC3D_GIT/CompuCell3D**:



Where is the source code: <path_to_CC3D_GIT_repository>/CompuCell3D

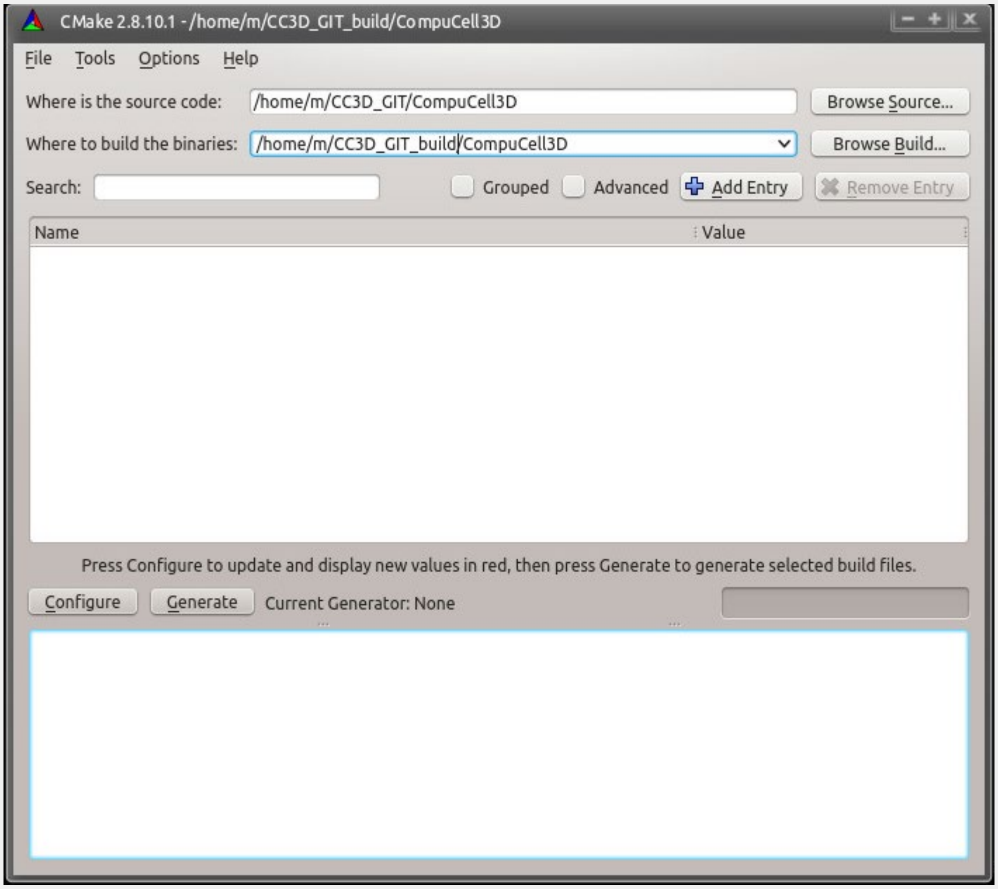
Where to build the binaries:

Search:

Press Configure to update and display new values in red, then press Generate to generate selected build files.

Current Generator: None

in addition to specifying source directory we also specify the location of the build directory i.e. a directory where compilation files will be stored. in my case it is **/home/m/CC3D_GIT_build/CompuCell3D**



Where is the source code: /home/m/CC3D_GIT/CompuCell3D

Where to build the binaries: /home/m/CC3D_GIT_build/CompuCell3D

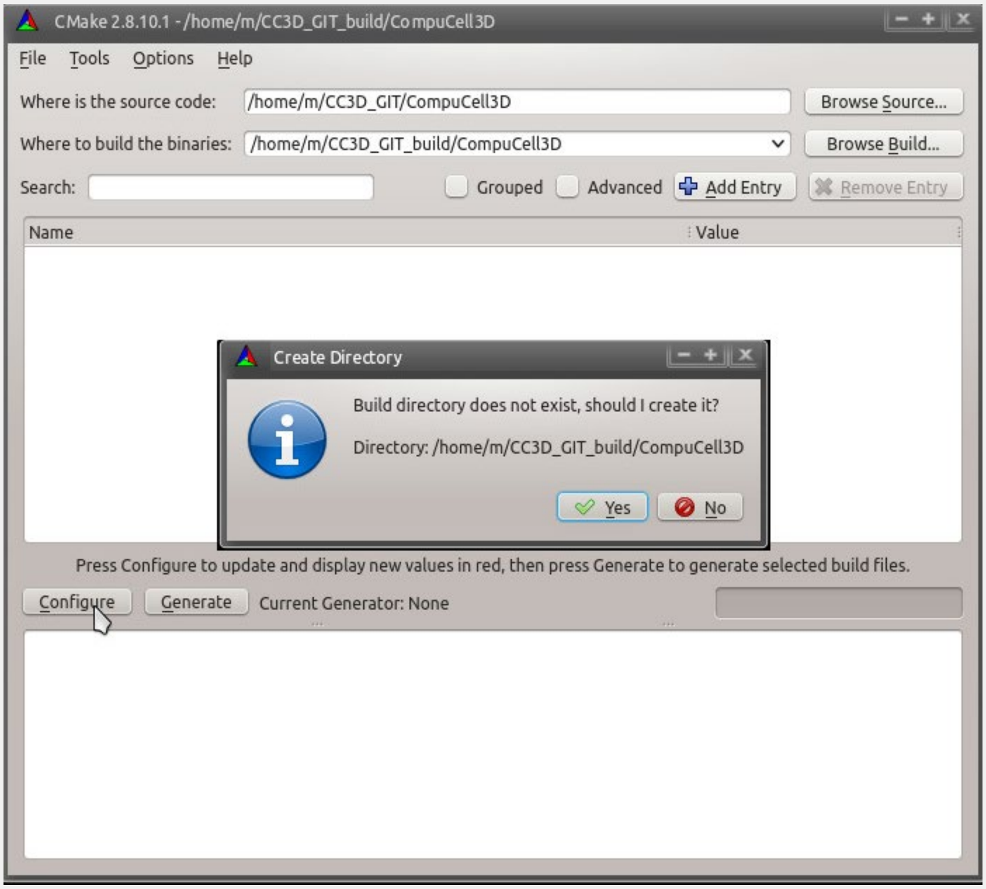
Search:

Press Configure to update and display new values in red, then press Generate to generate selected build files.

Current Generator: None

Build Configuration: Selecting Build System

We are ready to click Configure. A dialog box asking to create the build directory will appear:



CMake 2.8.10.1 - /home/m/CC3D_GIT_build/CompuCell3D

Where is the source code: /home/m/CC3D_GIT/CompuCell3D

Where to build the binaries: /home/m/CC3D_GIT_build/CompuCell3D

Create Directory

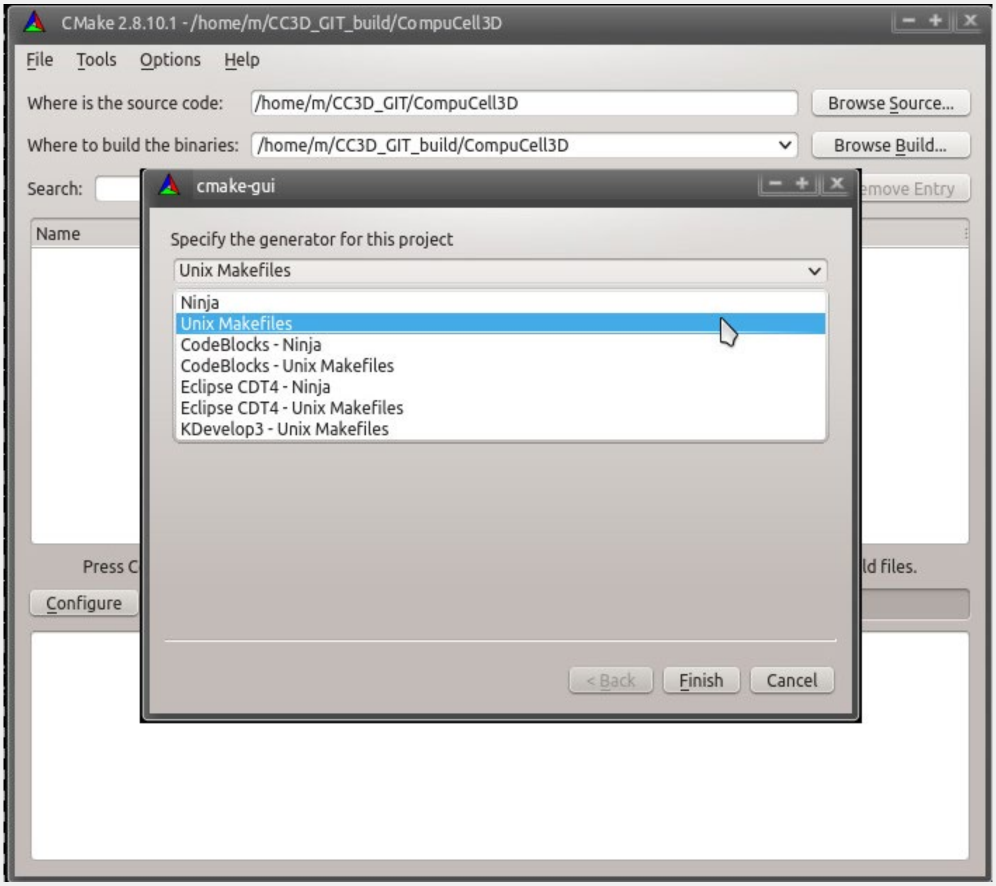
Build directory does not exist, should I create it?

Directory: /home/m/CC3D_GIT_build/CompuCell3D

Press Configure to update and display new values in red, then press Generate to generate selected build files.

Current Generator: None

and then one asking about the build system:



CMake 2.8.10.1 - /home/m/CC3D_GIT_build/CompuCell3D

Where is the source code: /home/m/CC3D_GIT/CompuCell3D

Where to build the binaries: /home/m/CC3D_GIT_build/CompuCell3D

cmake-gui

Specify the generator for this project

Unix Makefiles

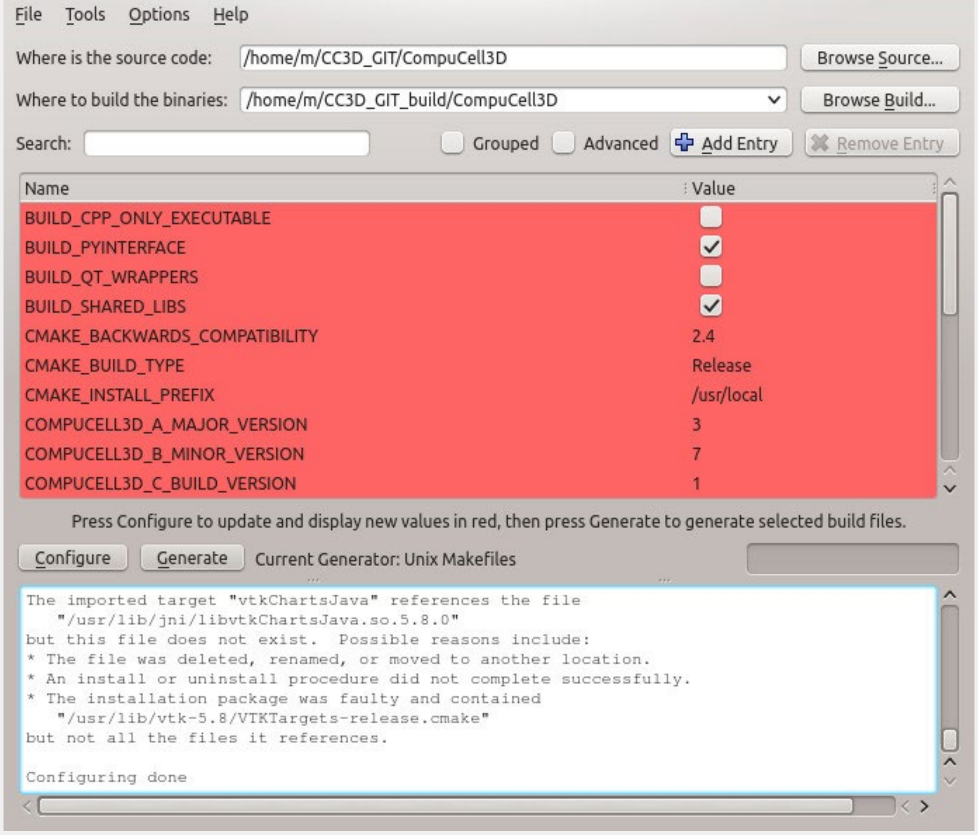
Select Unix Makefiles for the generator, select Use default native compilers and then click Finish. CMake will begin the configuration process. CMake will attempt to locate all of the dependencies installed above. If the following error occurs, ignore it:

```
CMake Error: Could not open file for write in copy operation /usr/local/pythonSetupScripts/Version.py.tmp
CMake Error: : System Error: No such file or directory
CMake Error at core/post_install_tasks/CMakeLists.txt:134 (configure_file):
  configure_file Problem configuring file
```

After the initial configuration has completed select `Grouped` and `Advanced` to make entering configuration values easier.

Build Configuration: CMAKE

In `CMAKE` confirm that CMake has located all the build tools. In the `CMAKE_BUILD_TYPE` field you may enter `Debug`, `RelWithDebInfo` or `Release` to specify the type of the binary you want to have - if you are developing extra modules compiling in the `Debug` or `RelWithDebInfo` can be helpful. By default Compucell3D build type is set to `Release`:



Where is the source code: /home/m/CC3D_GIT/CompuCell3D

Where to build the binaries: /home/m/CC3D_GIT_build/CompuCell3D

Search:

□ Grouped □ Advanced

Name	Value
BUILD_CPP_ONLY_EXECUTABLE	□
BUILD_PYINTERFACE	☑
BUILD_QT_WRAPPERS	□
BUILD_SHARED_LIBS	☑
CMAKE_BACKWARDS_COMPATIBILITY	2.4
CMAKE_BUILD_TYPE	Release
CMAKE_INSTALL_PREFIX	/usr/local
COMPUCELL3D_A_MAJOR_VERSION	3
COMPUCELL3D_B_MINOR_VERSION	7
COMPUCELL3D_C_BUILD_VERSION	1

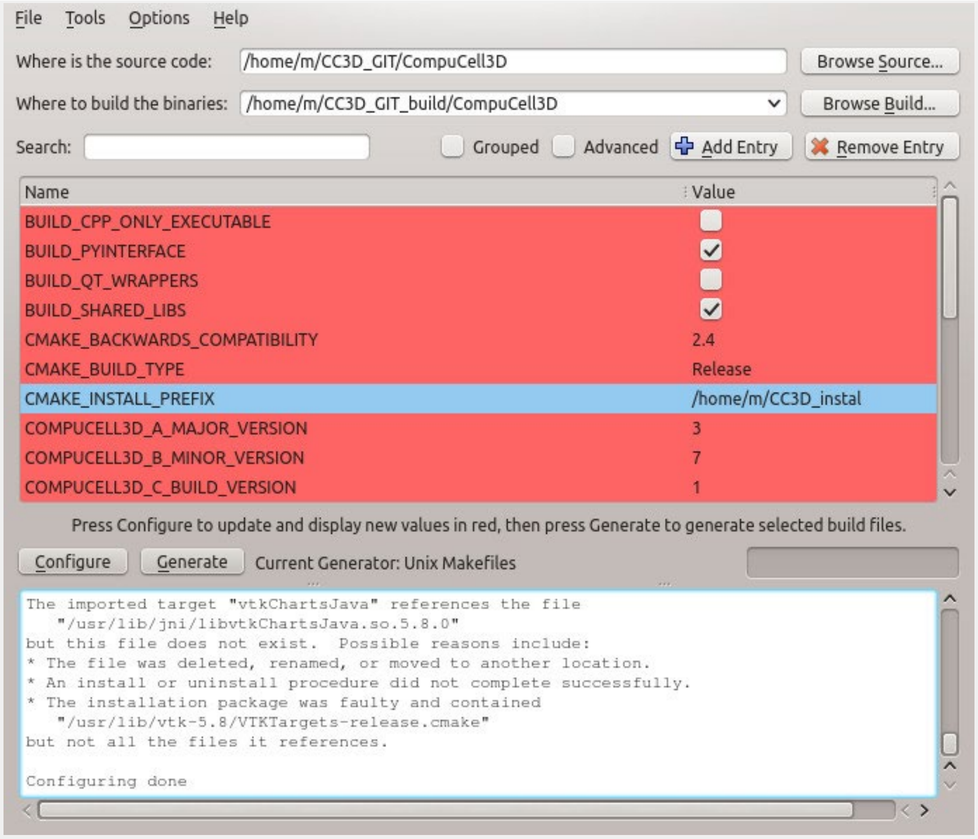
Press Configure to update and display new values in red, then press Generate to generate selected build files.

Current Generator: Unix Makefiles

```
The imported target "vtkChartsJava" references the file
   "/usr/lib/jni/libvtkChartsJava.so.5.8.0"
but this file does not exist.  Possible reasons include:
* The file was deleted, renamed, or moved to another location.
* An install or uninstall procedure did not complete successfully.
* The installation package was faulty and contained
   "/usr/lib/vtk-5.8/VTKTargets-release.cmake"
but not all the files it references.

Configuring done
```

In the `CMAKE_INSTALL_PREFIX` field enter the directory you would like to install CompuCell3D into - this is important. We recommend that unless necessary you shold install CC3D into local directory - in my case it is **/home/m/CC3D_install**, .



Where is the source code: /home/m/CC3D_GIT/CompuCell3D

Where to build the binaries: /home/m/CC3D_GIT_build/CompuCell3D

Search:

□ Grouped □ Advanced

Name	Value
BUILD_CPP_ONLY_EXECUTABLE	□
BUILD_PYINTERFACE	☑
BUILD_QT_WRAPPERS	□
BUILD_SHARED_LIBS	☑
CMAKE_BACKWARDS_COMPATIBILITY	2.4
CMAKE_BUILD_TYPE	Release
CMAKE_INSTALL_PREFIX	/home/m/CC3D_instal
COMPUCELL3D_A_MAJOR_VERSION	3
COMPUCELL3D_B_MINOR_VERSION	7
COMPUCELL3D_C_BUILD_VERSION	1

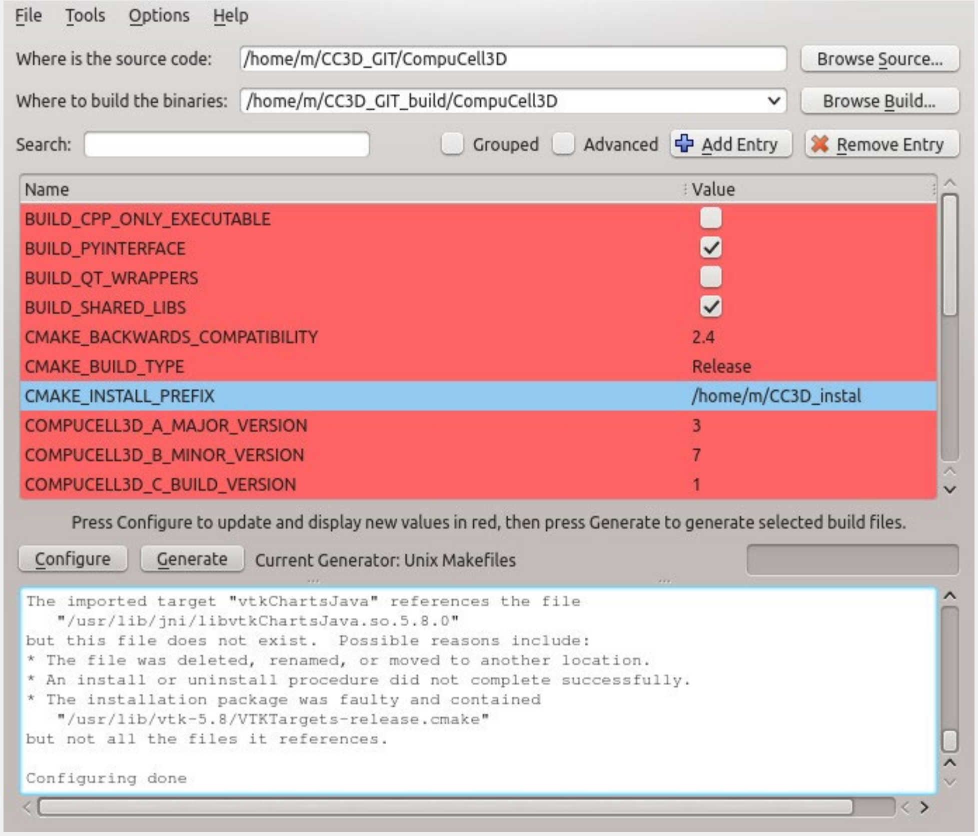
Press Configure to update and display new values in red, then press Generate to generate selected build files.

Current Generator: Unix Makefiles

```
The imported target "vtkChartsJava" references the file
   "/usr/lib/jni/libvtkChartsJava.so.5.8.0"
but this file does not exist.  Possible reasons include:
* The file was deleted, renamed, or moved to another location.
* An install or uninstall procedure did not complete successfully.
* The installation package was faulty and contained
   "/usr/lib/vtk-5.8/VTKTargets-release.cmake"
but not all the files it references.

Configuring done
```

Click on Configure to have all the values updated. Click on Configure and then click on Generate to generate the Makefiles, ignore any warnings. Exit CMake

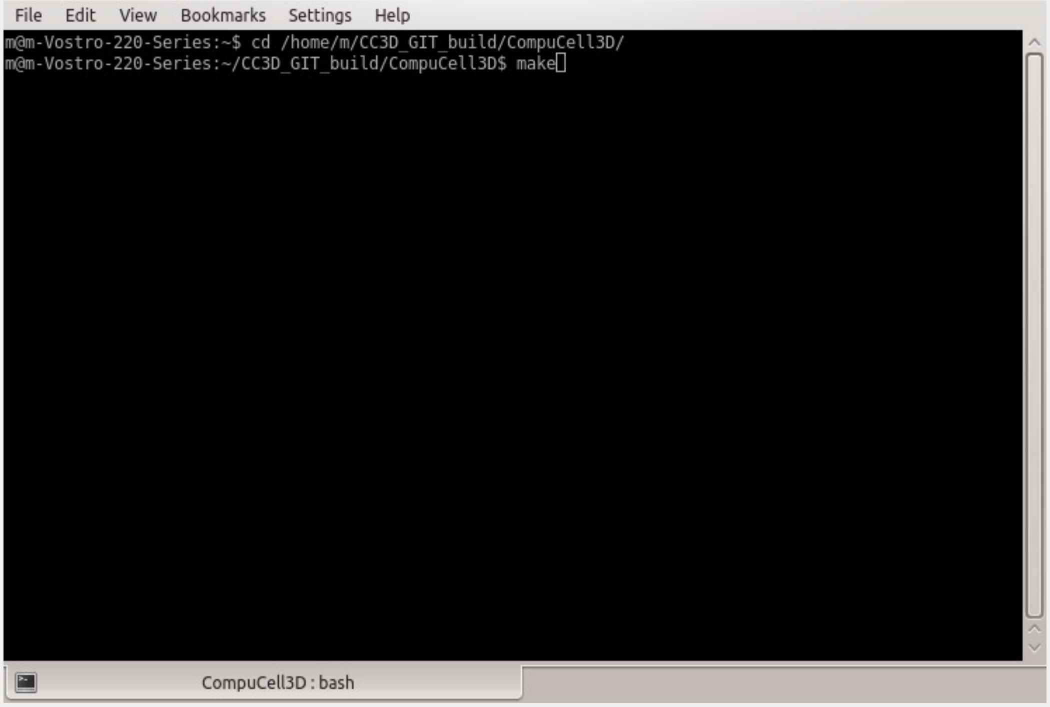

File
Tools
Options
Help
Where is the source code: /home/m/CC3D_GIT/CompuCell3D
Browse Source...
Where to build the binaries: /home/m/CC3D_GIT_build/CompuCell3D
Browse Build...
Search:
□ Grouped □ Advanced
Add Entry
Remove Entry
Name Value
BUILD_CPP_ONLY_EXECUTABLE □
BUILD_PYINTERFACE ☑
BUILD_QT_WRAPPERS □
BUILD_SHARED_LIBS ☑
CMAKE_BACKWARDS_COMPATIBILITY 2.4
CMAKE_BUILD_TYPE Release
CMAKE_INSTALL_PREFIX /home/m/CC3D_instal
COMPUCELL3D_A_MAJOR_VERSION 3
COMPUCELL3D_B_MINOR_VERSION 7
COMPUCELL3D_C_BUILD_VERSION 1
Press Configure to update and display new values in red, then press Generate to generate selected build files.
Configure Generate Current Generator: Unix Makefiles
The imported target "vtkChartsJava" references the file
"/usr/lib/jni/libvtkChartsJava.so.5.8.0"
but this file does not exist. Possible reasons include:
* The file was deleted, renamed, or moved to another location.
* An install or uninstall procedure did not complete successfully.
* The installation package was faulty and contained
"/usr/lib/vtk-5.8/VTKTargets-release.cmake"
but not all the files it references.
Configuring done

Building

To begin compiling CompuCell3D enter the build directory specified in the Where to build the binaries field of CMake earlier and use the following command:

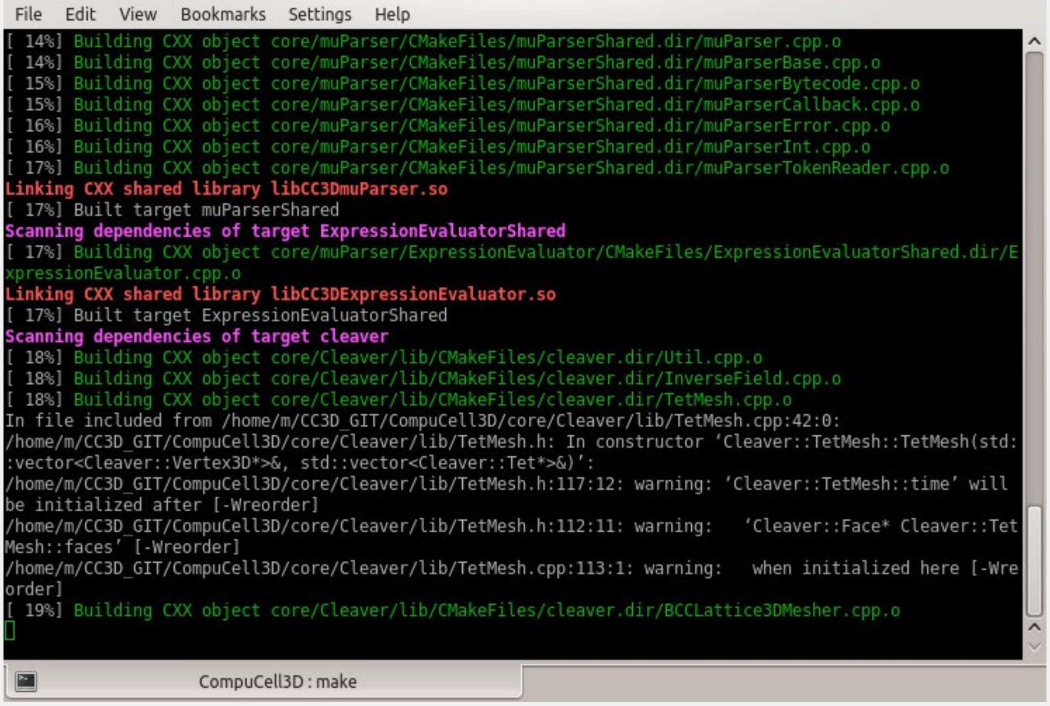
In my case I type:

```
cd /home/m/CC3D_GIT_build/CompuCell3D
make
```



```
m@m-Vostro-220-Series:~$ cd /home/m/CC3D_GIT_build/CompuCell3D/
m@m-Vostro-220-Series:~/CC3D_GIT_build/CompuCell3D$ make
```

After the build begins you may see screen like this one:

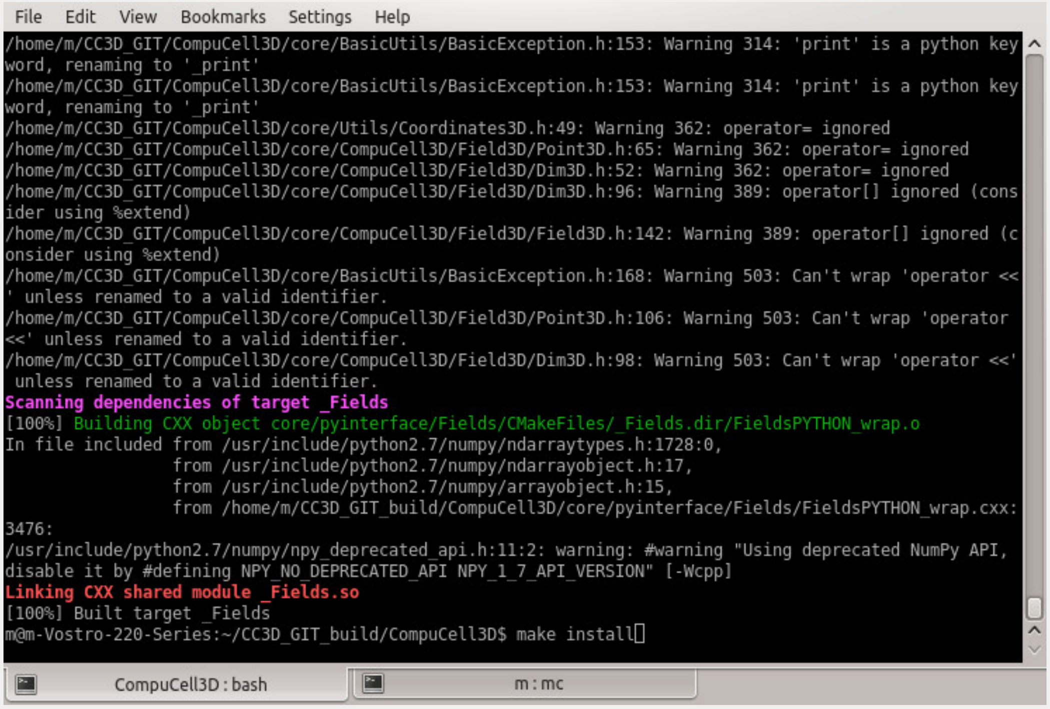


```
[ 14%] Building CXX object core/muParser/CMakeFiles/muParserShared.dir/muParser.cpp.o
[ 14%] Building CXX object core/muParser/CMakeFiles/muParserShared.dir/muParserBase.cpp.o
[ 15%] Building CXX object core/muParser/CMakeFiles/muParserShared.dir/muParserBytecode.cpp.o
[ 15%] Building CXX object core/muParser/CMakeFiles/muParserShared.dir/muParserCallback.cpp.o
[ 16%] Building CXX object core/muParser/CMakeFiles/muParserShared.dir/muParserError.cpp.o
[ 16%] Building CXX object core/muParser/CMakeFiles/muParserShared.dir/muParserInt.cpp.o
[ 17%] Building CXX object core/muParser/CMakeFiles/muParserShared.dir/muParserTokenReader.cpp.o
Linking CXX shared library libCC3DmuParser.so
[ 17%] Built target muParserShared
Scanning dependencies of target ExpressionEvaluatorShared
[ 17%] Building CXX object core/muParser/ExpressionEvaluator/CMakeFiles/ExpressionEvaluatorShared.dir/E
xpressionEvaluator.cpp.o
Linking CXX shared library libCC3DExpressionEvaluator.so
[ 17%] Built target ExpressionEvaluatorShared
Scanning dependencies of target cleaver
[ 18%] Building CXX object core/Cleaver/lib/CMakeFiles/cleaver.dir/Util.cpp.o
[ 18%] Building CXX object core/Cleaver/lib/CMakeFiles/cleaver.dir/InverseField.cpp.o
[ 18%] Building CXX object core/Cleaver/lib/CMakeFiles/cleaver.dir/TetMesh.cpp.o
In file included from /home/m/CC3D_GIT/CompuCell3D/core/Cleaver/lib/TetMesh.cpp:42:0:
/home/m/CC3D_GIT/CompuCell3D/core/Cleaver/lib/TetMesh.h: In constructor ‘Cleaver::TetMesh::TetMesh(std:
:vector<Cleaver::Vertex3D*>&, std::vector<Cleaver::Tet*>&)’:
/home/m/CC3D_GIT/CompuCell3D/core/Cleaver/lib/TetMesh.h:117:12: warning: ‘Cleaver::TetMesh::time’ will
be initialized after [-Wreorder]
/home/m/CC3D_GIT/CompuCell3D/core/Cleaver/lib/TetMesh.h:112:11: warning:   ‘Cleaver::Face* Cleaver::Tet
Mesh::faces’ [-Wreorder]
/home/m/CC3D_GIT/CompuCell3D/core/Cleaver/lib/TetMesh.cpp:113:1: warning:   when initialized here [-Wre
order]
[ 19%] Building CXX object core/Cleaver/lib/CMakeFiles/cleaver.dir/BCCLattice3DMesher.cpp.o
```

Installing

Once compiling has completed CompuCell3D can be installed into the directory specified in the `CMAKE_INSTALL_PREFIX` field earlier by issuing the following command:

```
make install
```



```
/home/m/CC3D_GIT/CompuCell3D/core/BasicUtils/BasicException.h:153: Warning 314: 'print' is a python key
word, renaming to '_print'
/home/m/CC3D_GIT/CompuCell3D/core/BasicUtils/BasicException.h:153: Warning 314: 'print' is a python key
word, renaming to '_print'
/home/m/CC3D_GIT/CompuCell3D/core/Utils/Coordinates3D.h:49: Warning 362: operator= ignored
/home/m/CC3D_GIT/CompuCell3D/core/CompuCell3D/Field3D/Point3D.h:65: Warning 362: operator= ignored
/home/m/CC3D_GIT/CompuCell3D/core/CompuCell3D/Field3D/Dim3D.h:52: Warning 362: operator= ignored
/home/m/CC3D_GIT/CompuCell3D/core/CompuCell3D/Field3D/Dim3D.h:96: Warning 389: operator[] ignored (cons
ider using %extend)
/home/m/CC3D_GIT/CompuCell3D/core/CompuCell3D/Field3D/Field3D.h:142: Warning 389: operator[] ignored (c
onsider using %extend)
/home/m/CC3D_GIT/CompuCell3D/core/BasicUtils/BasicException.h:168: Warning 503: Can't wrap 'operator <<
' unless renamed to a valid identifier.
/home/m/CC3D_GIT/CompuCell3D/core/CompuCell3D/Field3D/Point3D.h:106: Warning 503: Can't wrap 'operator
<<' unless renamed to a valid identifier.
/home/m/CC3D_GIT/CompuCell3D/core/CompuCell3D/Field3D/Dim3D.h:98: Warning 503: Can't wrap 'operator <<'
 unless renamed to a valid identifier.
Scanning dependencies of target _Fields
[100%] Building CXX object core/pyinterface/Fields/CMakeFiles/_Fields.dir/FieldsPYTHON_wrap.o
In file included from /usr/include/python2.7/numpy/ndarraytypes.h:1728:0,
                 from /usr/include/python2.7/numpy/ndarrayobject.h:17,
                 from /usr/include/python2.7/numpy/arrayobject.h:15,
                 from /home/m/CC3D_GIT_build/CompuCell3D/core/pyinterface/Fields/FieldsPYTHON_wrap.cxx:
3476:
/usr/include/python2.7/numpy/npy_deprecated_api.h:11:2: warning: #warning "Using deprecated NumPy API,
disable it by #defining NPY_NO_DEPRECATED_API NPY_1_7_API_VERSION" [-Wcpp]
Linking CXX shared module _Fields.so
[100%] Built target _Fields
m@m-Vostro-220-Series:~/CC3D_GIT_build/CompuCell3D$ make install
```

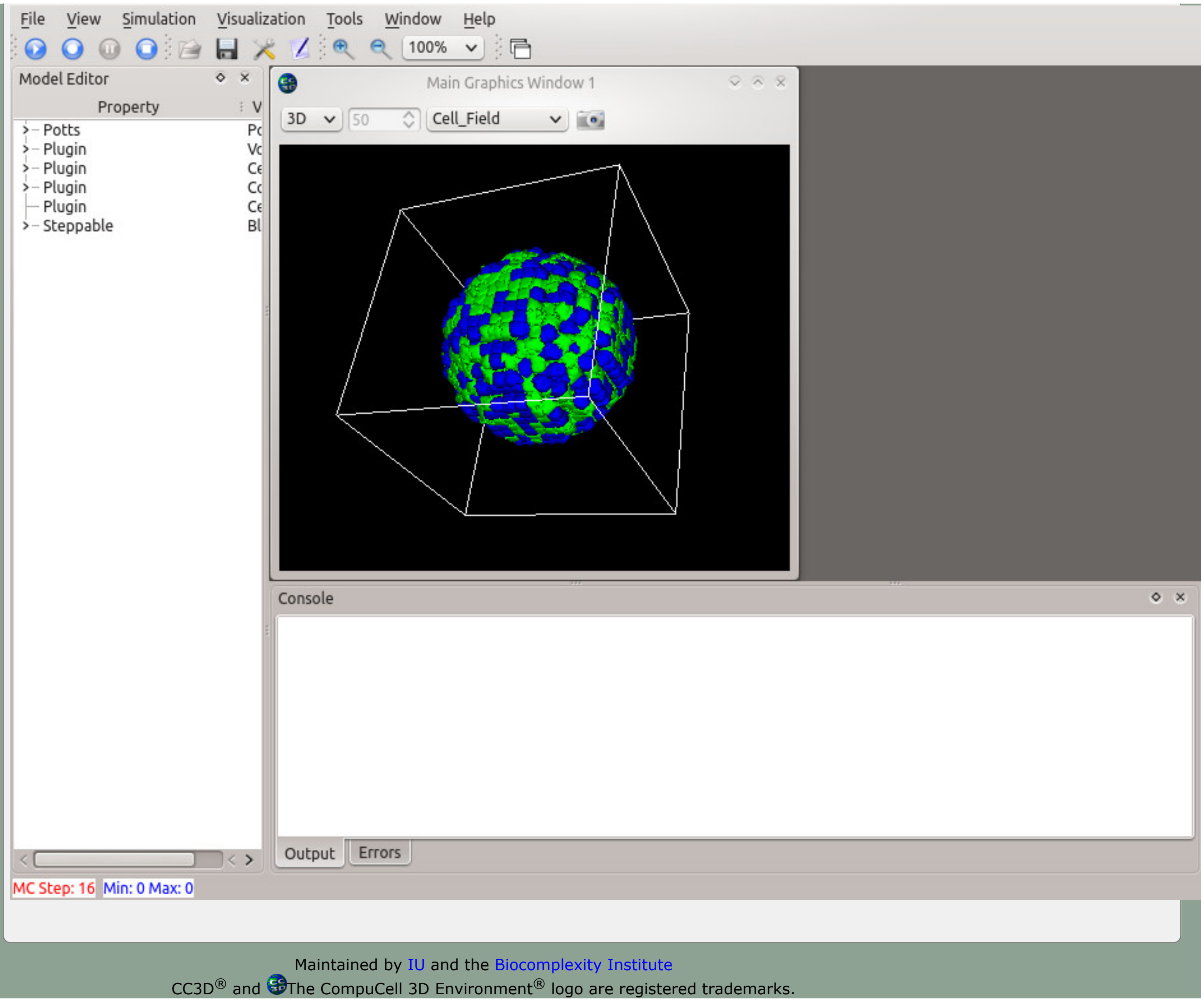
Running

After CompuCell3D has finished installing you can start CompuCell3D by entering the installation directory (in my case it is in **/home/m/CC3D_install**):

```
cd /home/m/CC3D_install
```

and issuing the following command:

```
./compucell3d.sh
```



MC Step: 16 Min: 0 Max: 0

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