G4-DNA Tutorial

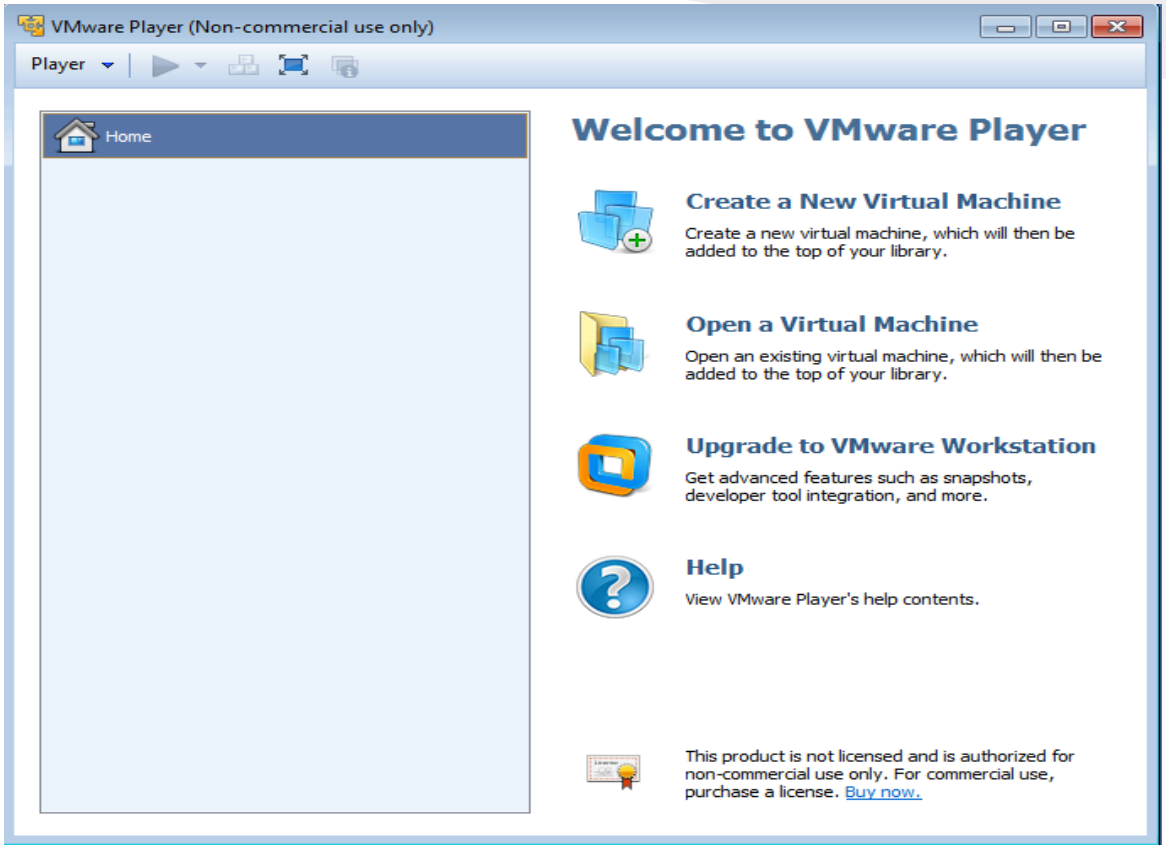
goo.gl/6YKVx4

Virtual Machine

Geant4-DNA tutorial,
November 7, 2014

ESA/ESTEC

Please, check your system installation …



Does everybody have a working VMware Player (or VMware fusion) ?

If not …

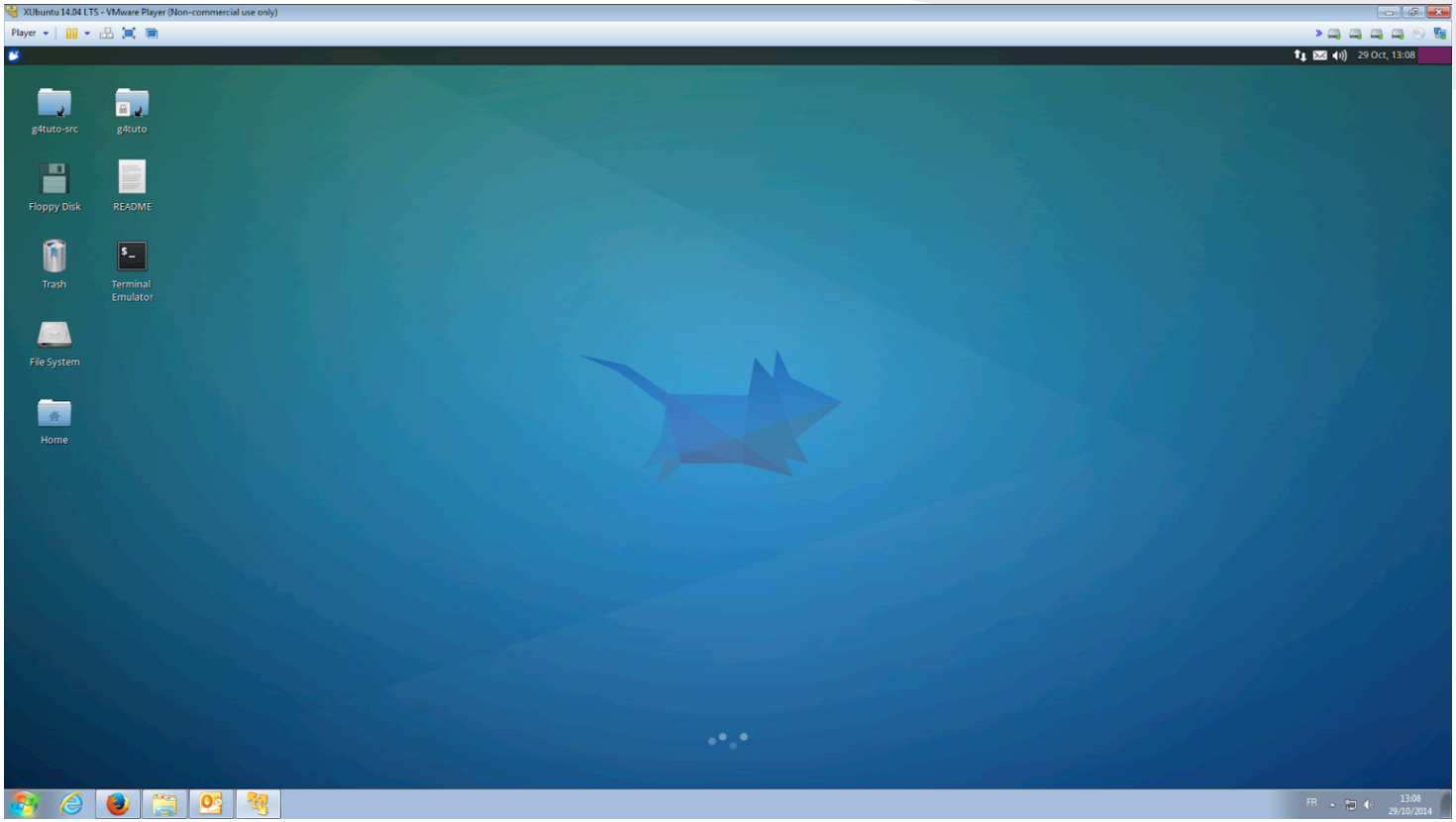
Are you a Mac user ?
You can use “VMware Fusion” instead of “Player”.
Use the unarchiver software to unzip the tutorial files. It is available for free on the AppStore.

If asked, declare the virtual machine has been copied (and not moved).

Could you check the file you downloaded ?
Size should be about 4,2 Go.

Did you check if the virtualization is activated in your bios ?

Please, check your system installation…



Does everybody have a working DNA virtual machine?

If not …

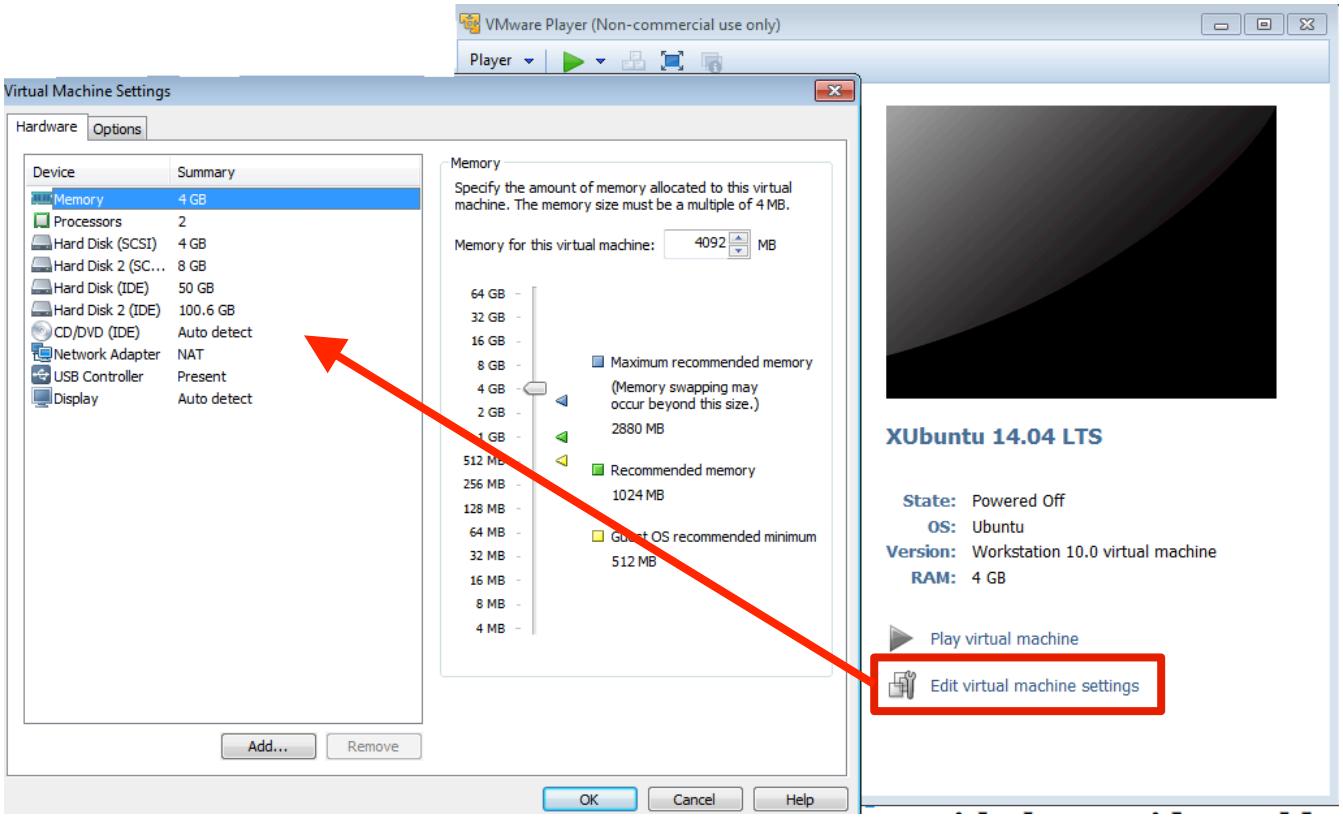
Did you get the following message:
"Virtualized Intel VT-x/EPT or AMD-V/RVI is not supported on this platform" ?

If yes, then close the virtual machine and do the following:

1. go in "Edit virtual machine settings"
2. in "Hardware" tab select "Processors"
3. in the "Virtualization engine" frame, in the "preferred mode" combo box, choose "Intel VT-x or AMD-V"

The Virtual Machine

A virtual machine is **a whole computer system** (**Guest system**) **emulated within your own computer** (**Host system**). Therefore, the emulated computer needs "virtual components" to work: virtual hard drive (simple file(s) on your computer), virtual processor, etc.

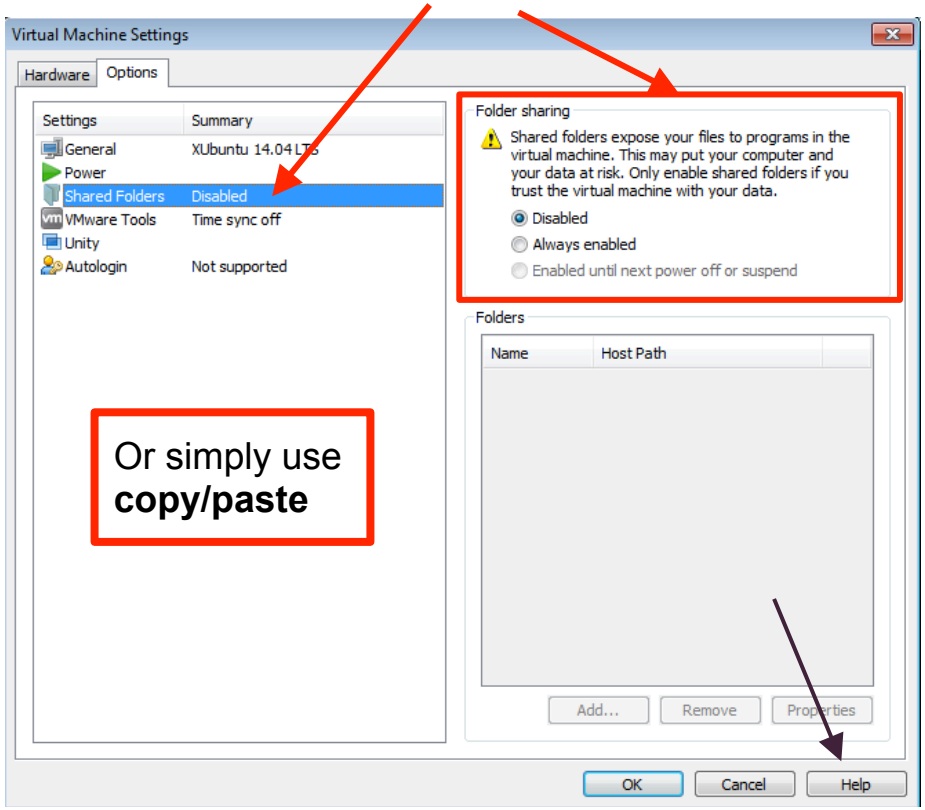


- 32-bit virtual system.
- Host system requires "virtualization" technology to be enabled (BIOS).
- Guest and Host systems require specific drivers for extended features.

Network

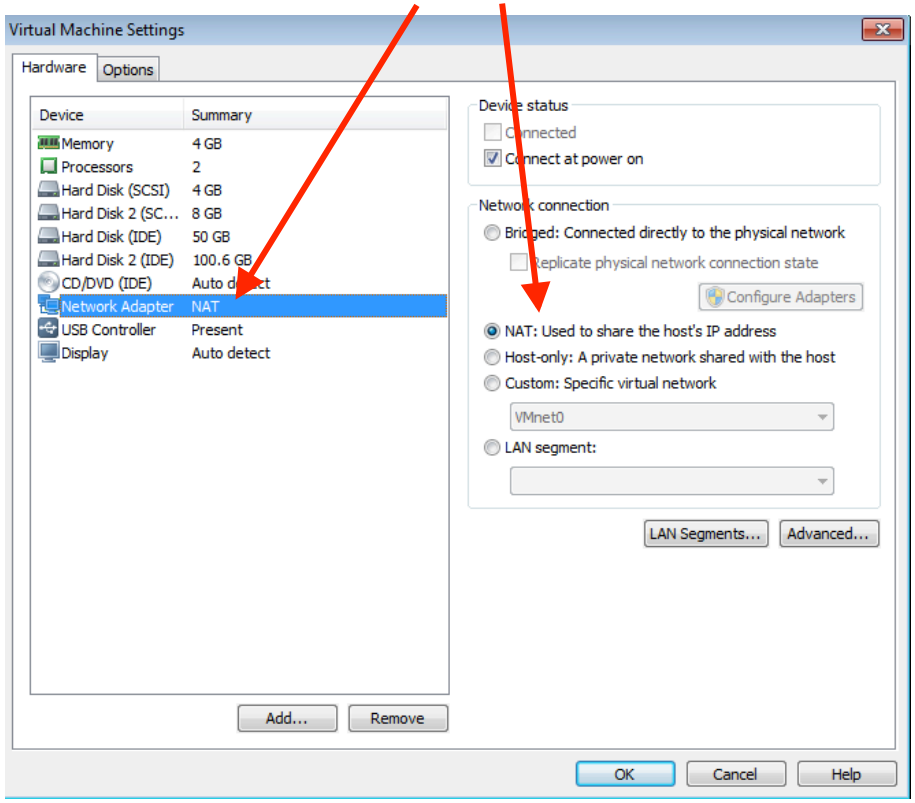
How does the Guest system communicate with the Host system and the outside world ?

Guest/Host



Or simply use **copy/paste**

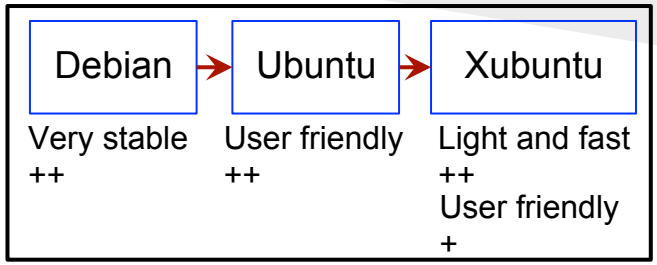
Guest/Network



The DNA Virtual Machine

Four virtual hard drives -> at least four files in your virtual machine folder.

1/ System files: Xubuntu 14.04 LTS
2/ Home
3/ Geant4 install tree
4/ Geant4 sources
(need to be downloaded through
the */mnt/g4tuto-src/bootstrap.sh* script)

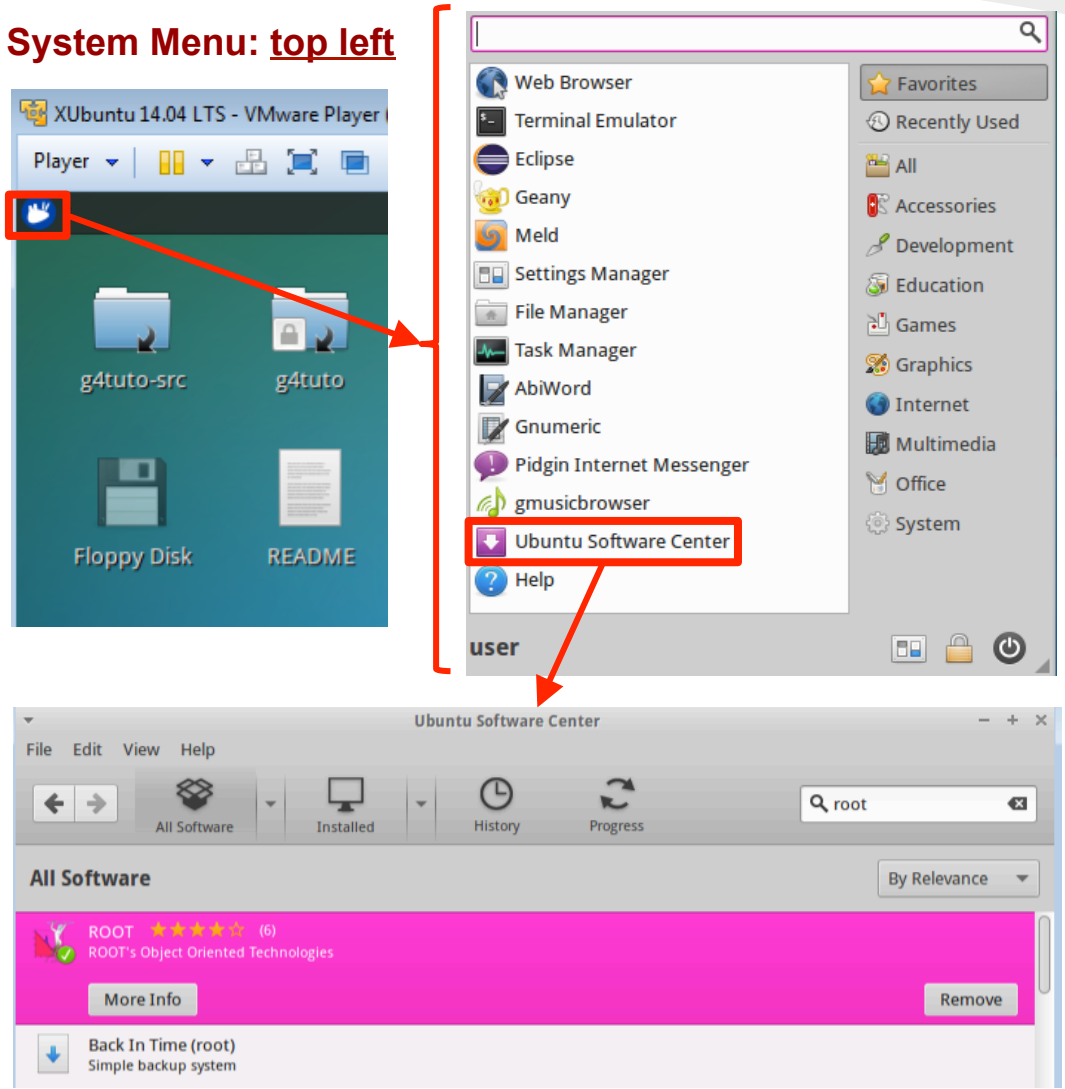


Some pre-installed software

- ROOT v5.31
  - Analyse data (among many other things)
- Geany
  - Quickly edit text files (nice auto-completion and highlighting features)
- Eclipse
  - Develop some code
- Software Center/Synaptic
  - Easily install new software/libraries on the system.
- Modulefile package
  - One command to load the Geant4 environment variables.
- GDB
  - Debugger, very useful.

Xubuntu 14.04

System Menu: top left



Xubuntu Tips

Open a terminal: CTRL+ALT+T.

Open a terminal in a folder: Right-click + select “open terminal here”.

System menu: accessible via the top-left blue/white button.

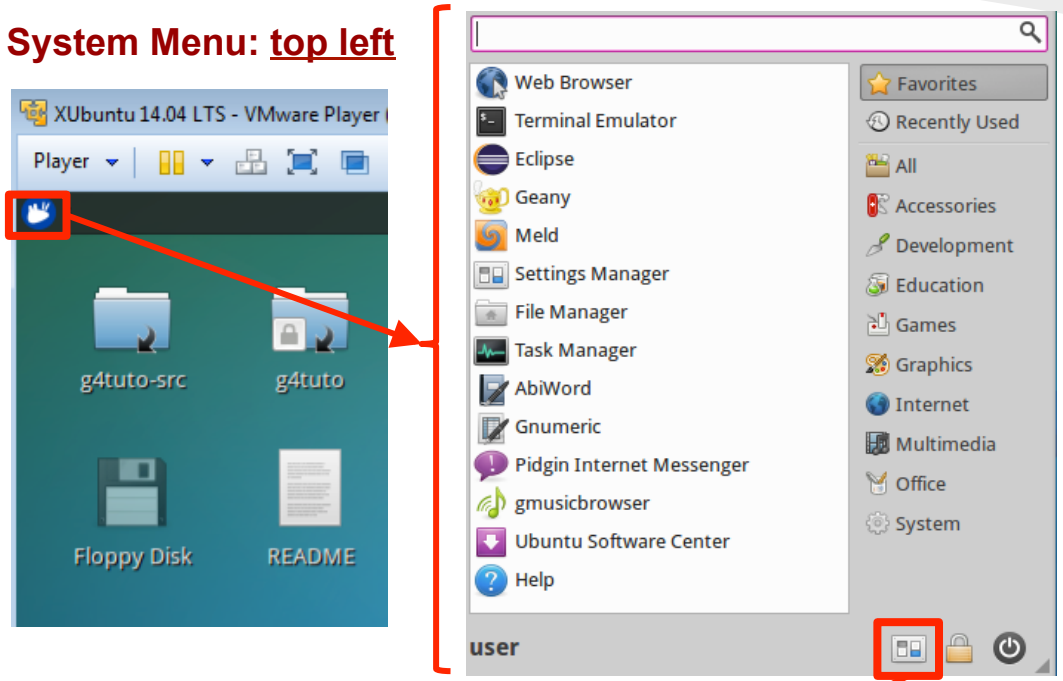
Resize a window: ALT + right-click on the window + move the mouse to resize it.

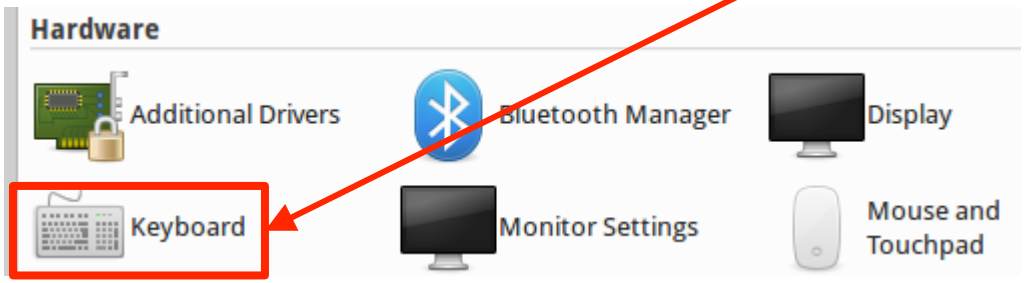
Open a root terminal session: sudo -i

Put the mouse in the Guest or in the Host system: Use CTRL+SHIFT+ALT to switch.

Xubuntu 14.04

System Menu: top left



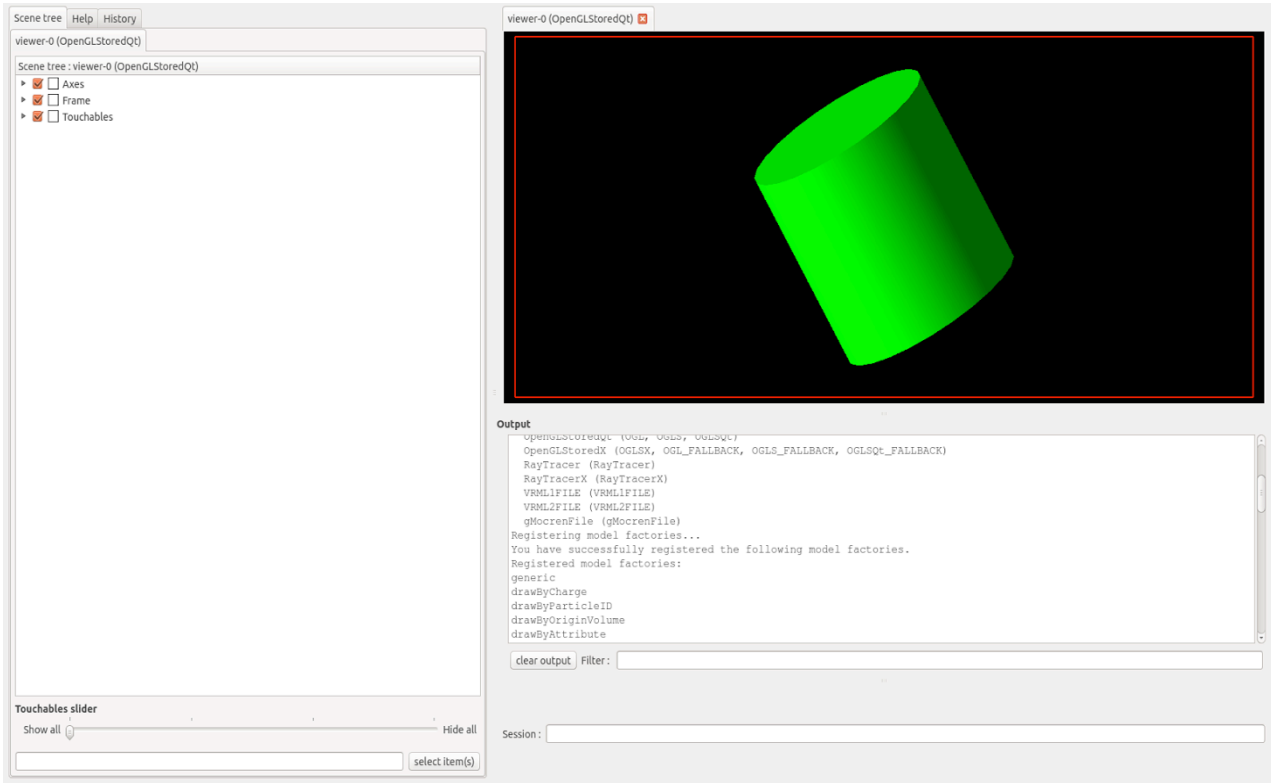


Change the keyboard config

1. **Go in “settings”**
2. **click on “keyboard”**
3. **Add the keyboard layout**
4. **Use ALT+SHIFT to switch.**

OpenGL and the VM

It is possible to use OpenGL inside the VirtualMachine. However, you should expect less performance because of the virtualization process.



Run a simulation

1. **Open a terminal**: CTRL+ALT+T
2. **Go to the "work folder" (create it)**:
   $ cd ~
   $ mkdir work
3. **Copy the example source files from the Geant4 disk**:
   $ cp -rf /mnt/g4tuto/geant4-10.01-install/share/Geant4-10.1.0/examples/extended/medical/dna ./
4. **Go into the chem1 folder**:
   $ cd dna/chem1
5. **Create the build directory and go in it**:
   $ mkdir build
   $ cd build
6. **Load the Geant4 environment variables thanks to the modulefile package**:
   $ module avail (->list the available modules)
   $ module load geant4/10.01-mt (->load the environment variables)
7. **Configure and do the build**:
   $ cmake ../
   $ make
8. **Run the example**:
   $ ./chem1

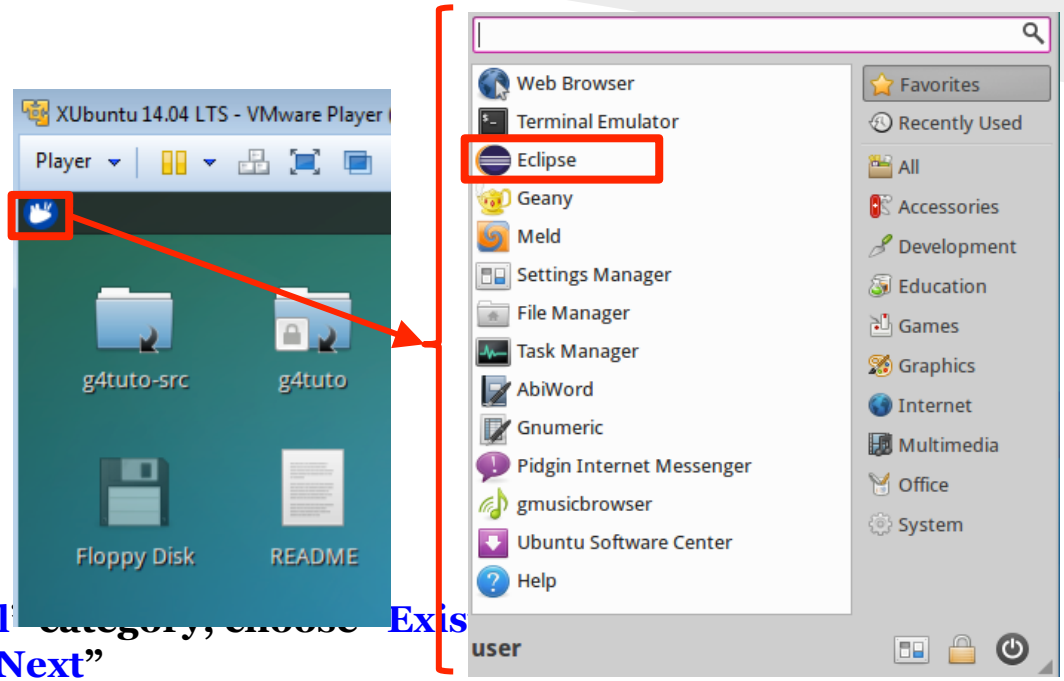
Use the GDB debugger:
$ gdb chem1 (->GDB start)
$ run (->chem1 start within GDB)
If a crash happens, use
$ bt
to print the stack trace.
To quit:
$ quit

Use Eclipse as an editor 1/2

1. **Open a terminal**: CTRL+ALT+T
2. **Create a work directory**:
   $ cd ~
   $ mkdir workEclipse
   $ cd workEclipse
3. **Copy the example source files from the Geant4 disk**:
   $ cp -rf /mnt/g4tuto/geant4-10.01-install/share/Geant4-10.1.0/examples/extended/medical/dna ./
4. **Go into the dna folder**:
   $ cd dna/
5. **Create the build directory ; go in it and load Geant4**:
   $ mkdir chem1-build
   $ cd chem1-build
   $ module load geant4/10.01-mt)
6. **Create a ready-to-build project (in Eclipse or in a terminal):**
   $ cmake ../chem1 -G"Eclipse CDT4 - Unix Makefiles" (don't copy/past: write that command by hand because of the "")
   $ make
7. **Open Eclipse ….**

Use Eclipse as an editor 2/2

Open Eclipse ....



Click on File
Click on Import
→ In the "General" category, choose "Existing Projects into Workspace"
→ Click on "Next"
Browse your tree to find the /home/user/work/dna/chem1-build directory
Click on "Finish"