



SEXTEN CENTER
FOR
ASTROPHYSICS

User Guide for Sexten 2017 Virtual Machine

Brought to you by:
Trieste Group

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Introduction

During our school, there will be some hands-on to learn the basics of some tools used in High Energy and Very High Energy Astrophysics, namely the *Fermi Science tools*, the *ctools* and *gammapy*. Since for the participants it would be annoying to install all the software needed and since technology provides us with a great tool called Virtual Machines (hereafter VM), we installed for you the software in a dedicated VM. In this way we will be ready for the hands-on sessions in a blink of an eye!
In the following we shall explain the steps to run without problems the VM, hopefully. Enjoy! :)

Software needed to run the VM

The recommended software to run the VM is VirtualBox. You can find the latest version up to date, 5.1.24, at the following link: <https://www.virtualbox.org/wiki/Downloads>. Choose the binary corresponding to the Operating System (OS) you are running on your laptop and download it. VirtualBox is shipped also as source code, but the binaries work just fine.

Installing the VirtualBox binary is as simple as double clicking on the installer (.exe for Windows, .dmg for MacOSX) and letting it do the work leaving the default settings. For Linux distributions, check https://www.virtualbox.org/wiki/Linux_Downloads for instructions on how to install VirtualBox on those systems. After installing VirtualBox, it is time to get the VM.

Getting the VM

You can get the VM at the following link: <https://pandora.infn.it/public/967ddc>. If you cannot download it for some reason, during the first days of the school we will provide some USB drives containing the VM.

The file containing the VM is called `Fermi-CTA_Sexten2017_ag5.ova`. Once you have it, you can double click on it and VirtualBox should open. Moreover, you should copy the other two directories contained in the USB drive (`Crab_2016` and `Crab_Flare_2014`), which will be needed for the Fermi Science Tools tutorial.

Some preliminary actions

When you open for the first time the VM with VirtualBox, you should something similar as Figure 1.

Just press “Import” and wait until the VM is imported into VirtualBox. At that point, you should see it in the list on the left, see Figure 2. The next time you will double click on `Sexten_School_17.ova`, it will ask you again to import, but you can press cancel since the VM was already imported the first time. To avoid this, you can open directly VirtualBox instead of the file containing the VM.

After importing the VM, you can see on the right section of the screen the details of the VM, grouped in several sections (General, System, Display etc.), see Figure 2. It is possible that the values of some parameters are not good for your system. To check if it is the case, click on the **Settings** button of the VM, which will open a new window where the user can change the values of the different settings. If some settings are invalid i.e. they will not make the VM work, VirtualBox will show the message “Invalid settings detected” at the bottom of the window, see Figure 3.

If invalid settings are there, VirtualBox lets the user change the settings of the VM. In particular, there are cursors to change the values of the parameters. The regions where the cursor is red mean that the parameter will be invalid if its value is in that region. The regions where the parameter value is valid are green instead. An example is showed in Figure 4.

The user can change the value of the parameter to make it valid. At this point the message “Invalid settings detected” will disappear, see Figure 5.

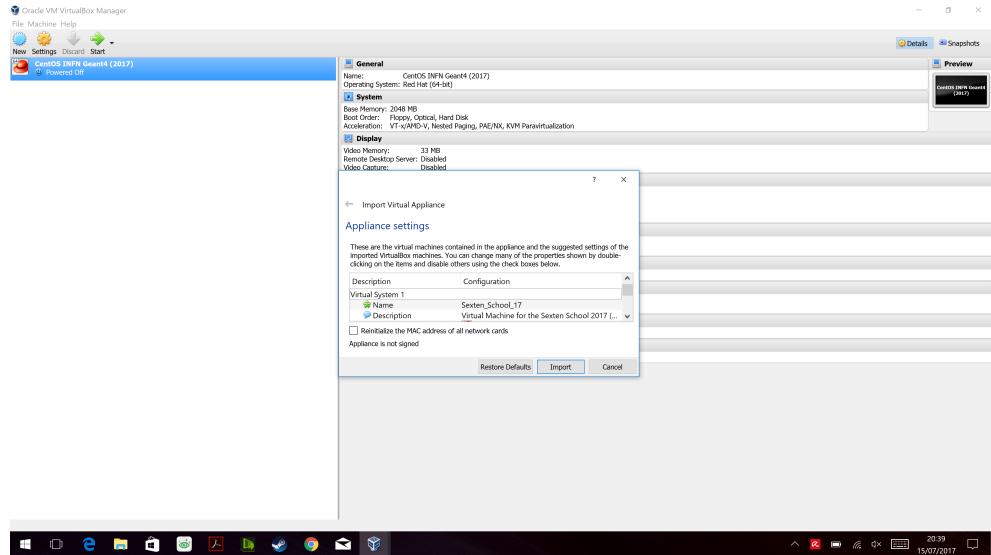


Figure 1: First time opening the VM

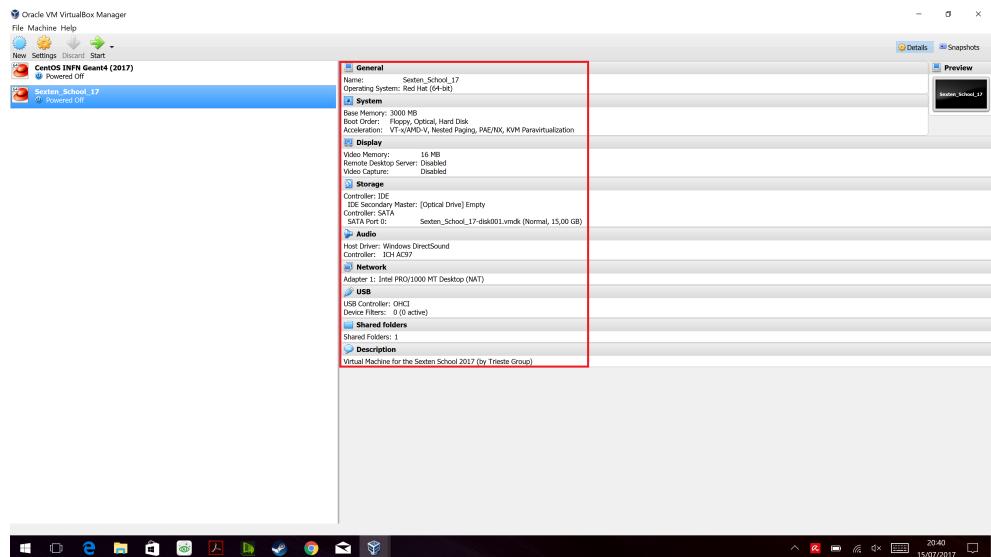


Figure 2: The red box contains the details of the VM in different sections.

If all the settings are valid, you can now change the last thing before starting the VM. The VM can have zero, one or more shared folders. A shared folder is a directory in the host Operative System where the user can put files to be retrieved later from the VM. The VM is shipped with a shared folder whose path is in the host system where the VM was created, so it will be an invalid path in any other host system. So, to create a shared folder in your host system you have to:

1. select the VM from the VirtualBox list and press the button **Settings**;
2. in the window opened, select the item “Shared Folders”. The VM has already a shared folder: remove it.
3. create a directory in your host system e.g. called “Share” (the directory name is not important)
4. from the “Shared Folder” menu, click the add button and select the path to the newly created “Share” directory. At this point you can see that the folder is

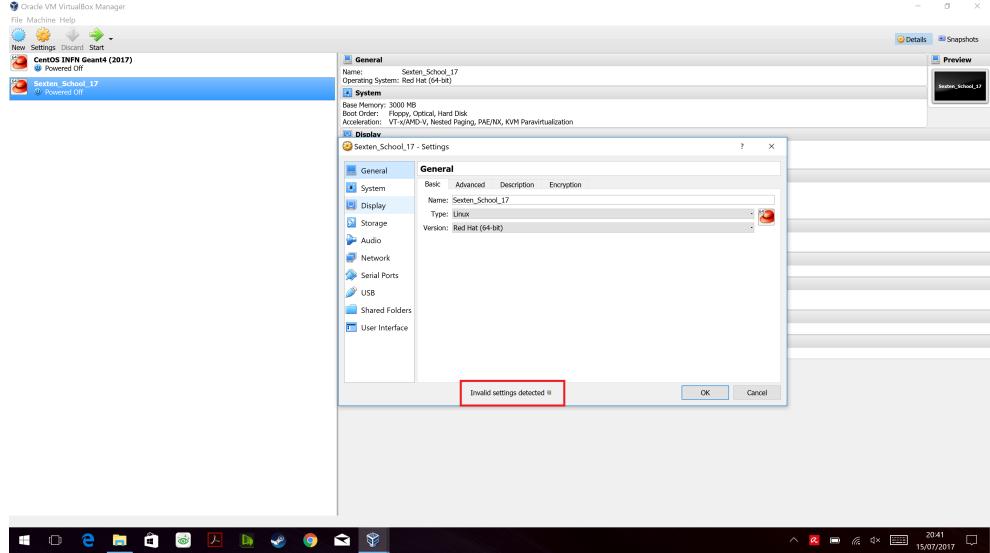


Figure 3: The window opened clicking on the **Settings** button and the message “Invalid settings detected”.

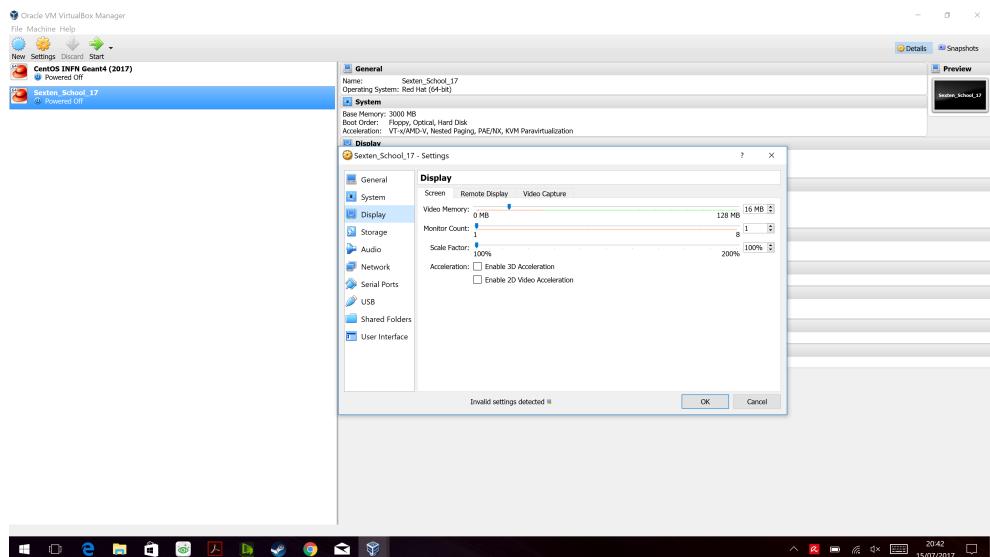


Figure 4: In this screenshot, the invalid setting is the Display Video Memory, which is set to 16 MB against a minimum value of 33 MB. The different colors of the cursor tell the user where the parameter value is valid (green) or invalid (red).

added to the list.

See Figure 6 for an example. When adding a shared directory, make sure that the directory name in your host system is the same as the “Folder name” and that the “Auto-mount” option is enabled, see Figure 5. At this point, the VM should be ready to run!

Running the VM

To run the VM, just select it from the list and press the **Start** button. A new window will open where a boot menu will appear. Choose the first option and Scientific Linux, the OS inside the VM, will boot. The Username of the VM is “Fermi-CTA” and the

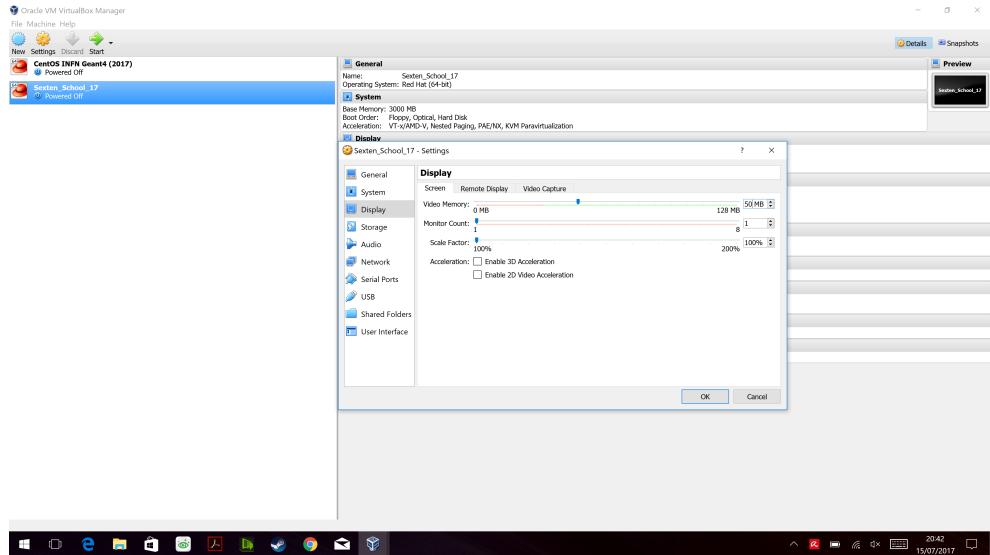


Figure 5: Changing the value of the Video Memory to 50 MB will make it valid and the message “Invalid settings detected” disappears.

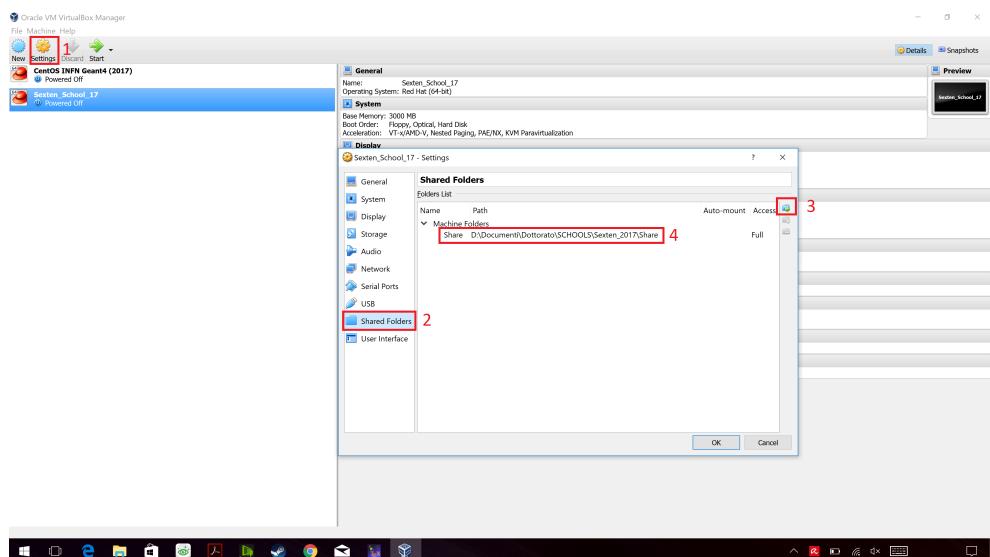


Figure 6: Adding a shared folder in VirtualBox. 1) Settings button 2) “Shared folder” menu 3) Add button 4) Path to the shared folder in the host system.

password is “latcta”. Once you type the password, you can use the OS inside the VM like you would do if it were installed in your PC.

To transfer files from your host system to the VM, use the Shared directory. In the desktop of the VM, there should be a directory called “sf_Share”. The path of this directory, if you want to work from the terminal, is `/media/sf_share/`. Whatever you put in this directory, is visible from both the VM and the host system. Figure 8 shows what you should see the first time you run the VM.

Connecting to the internet

The VM connects to the internet through the connection of the host system. So, if the host system is not connected to a network (wifi or cable), then the VM cannot connect to the internet. By default, when you run the VM, you are not connected

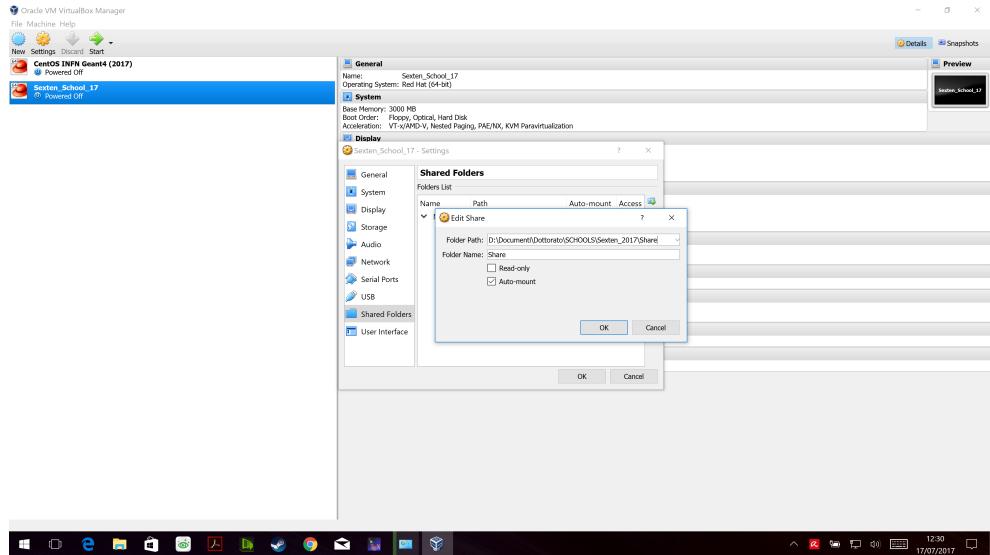


Figure 7: Make sure the name of the directory is the same as “Folder Name” and that “Auto-mount” option is checked!

to the internet. To connect just go to the menu **Applications > System Tools > Settings** and choose **Network** from the window it will open. Then select **Wired** and turn it on with the button on the right. At this point you should be able to surf with a browser.



Figure 8: The VM desktop as you should see it if everything is set correctly.

Software inside the VM

The following list contains the software installed in the VM:

- Fermi Science Tools v10r0p5 (<https://fermi.gsfc.nasa.gov/ssc/data/analysis/software/>)
- ctools 1.3.0, based on gammalib 1.3.0 library (<http://cta.irap.omp.eu/ctools/> and <http://cta.irap.omp.eu/gammalib/>)
- gammalpy (<http://docs.gammalpy.org/en/latest/>)

- auxiliary software: ds9, fv, FTOOLS, TEMPO2 ...

Troubleshooting

- In some high resolution screens, it can happen that the font size is too small to be easily readable without staying too close to the screen. To avoid fast aging of your eyes retinas, you can select the menu **View → Scale Factor** and choose a proper value
- Some laptops, especially those with AMD cpus, do not have the processor virtualization enabled. If that's the case, when trying to run the VM, you will get an error saying that the hardware acceleration is not available on your system. To solve this, you have to get into the BIOS menu of your pc. To do this, restart your pc and press few times F2 or F6 (it is brand dependent, if they do not work, search on the internet which key allows you to enter the BIOS menu). This will get you to the BIOS menu. Search for the virtualization settings and enable it. Then try again to run the VM.