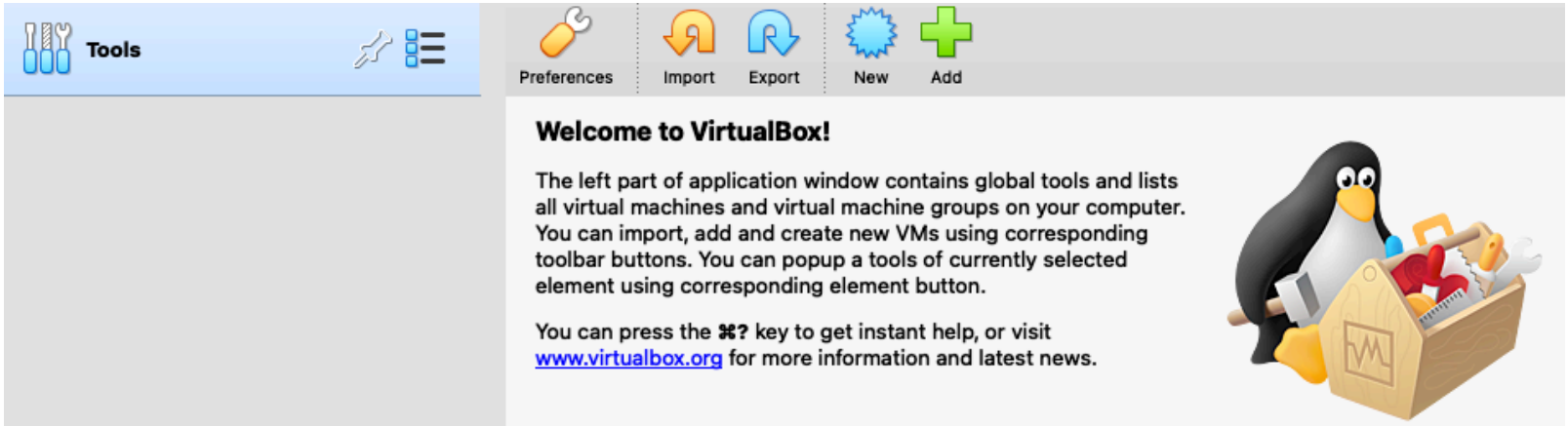
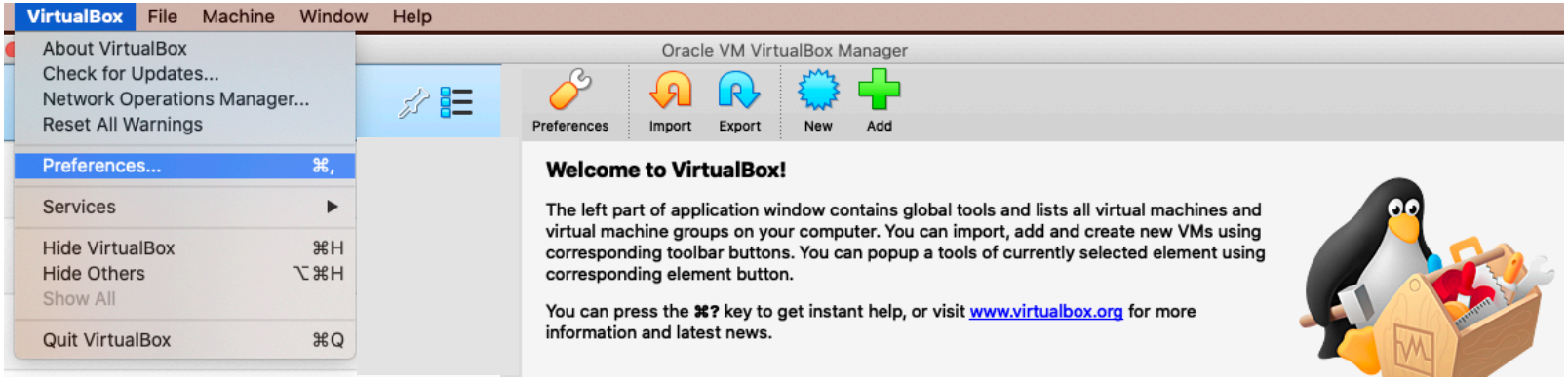
Freesurfer VirtualBox Image

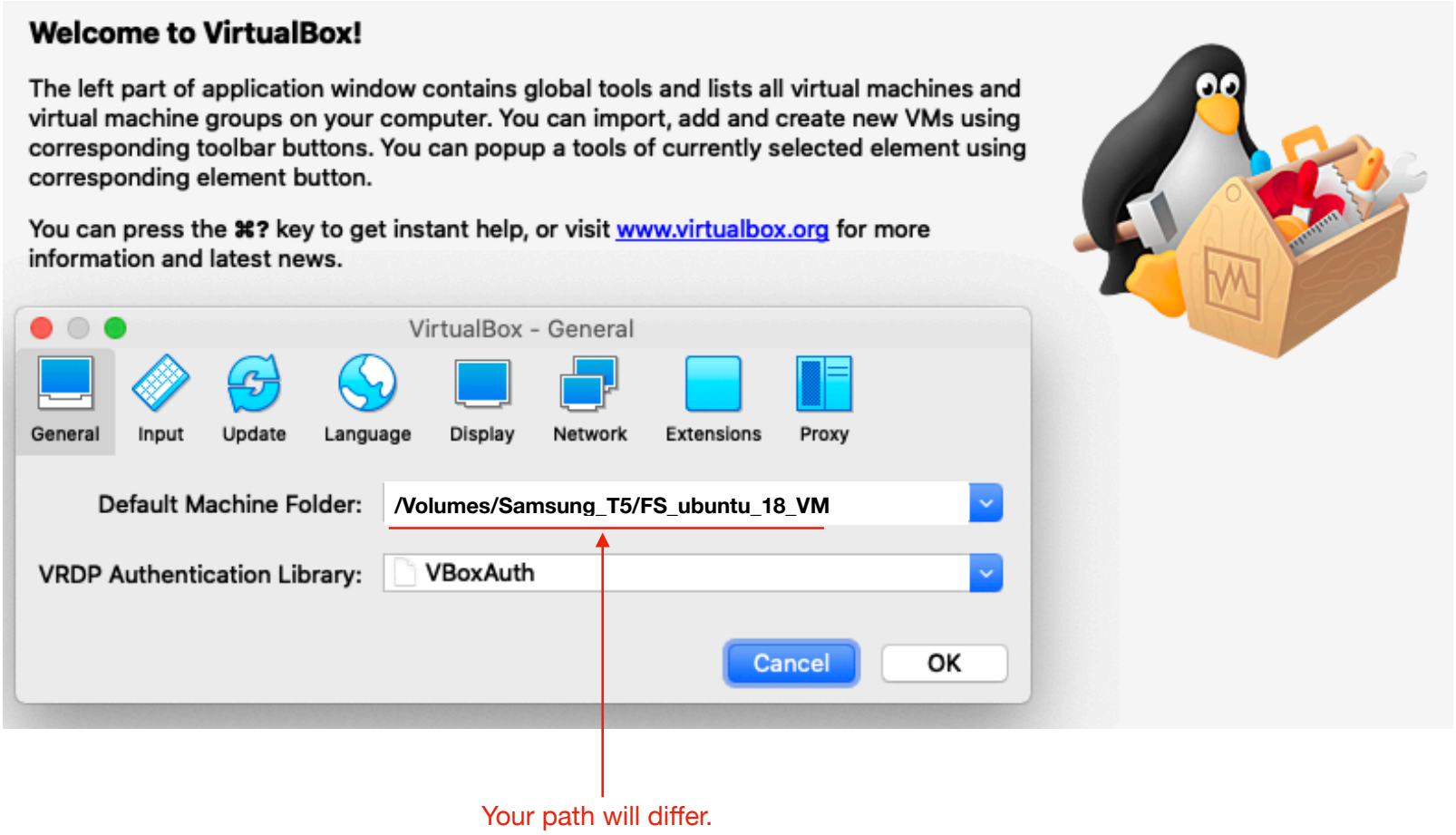
Launch the VirtualBox application on your (host) machine. If you just finished installing VirtualBox for the first time, then you will see no machine images are available to run on the left hand side of the GUI.



Select “Preferences” from the VirtualBox application pull down menu.

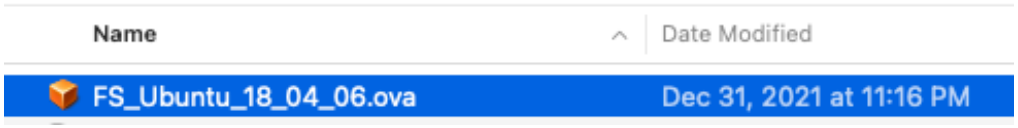


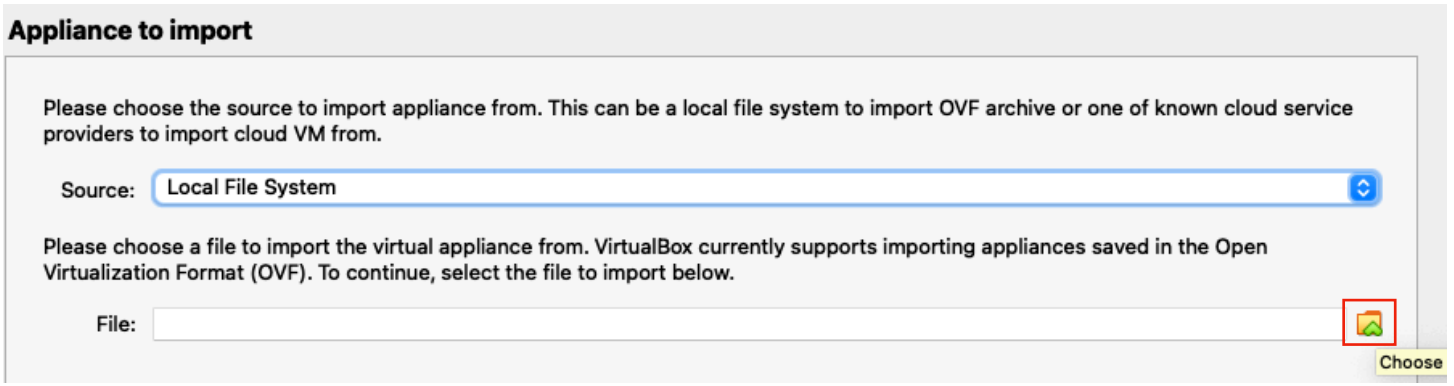
Create a DEFAULT MACHINE FOLDER PATH on an (external or internal) drive where you have at least 30G of free disk space for VirtualBox to store the virtual machine. In the example below, the path under /Volumes/… was manually created on a different drive than the boot drive in order to enhance performance. External drives w/o a USB 3.0 or faster connection are not recommended.



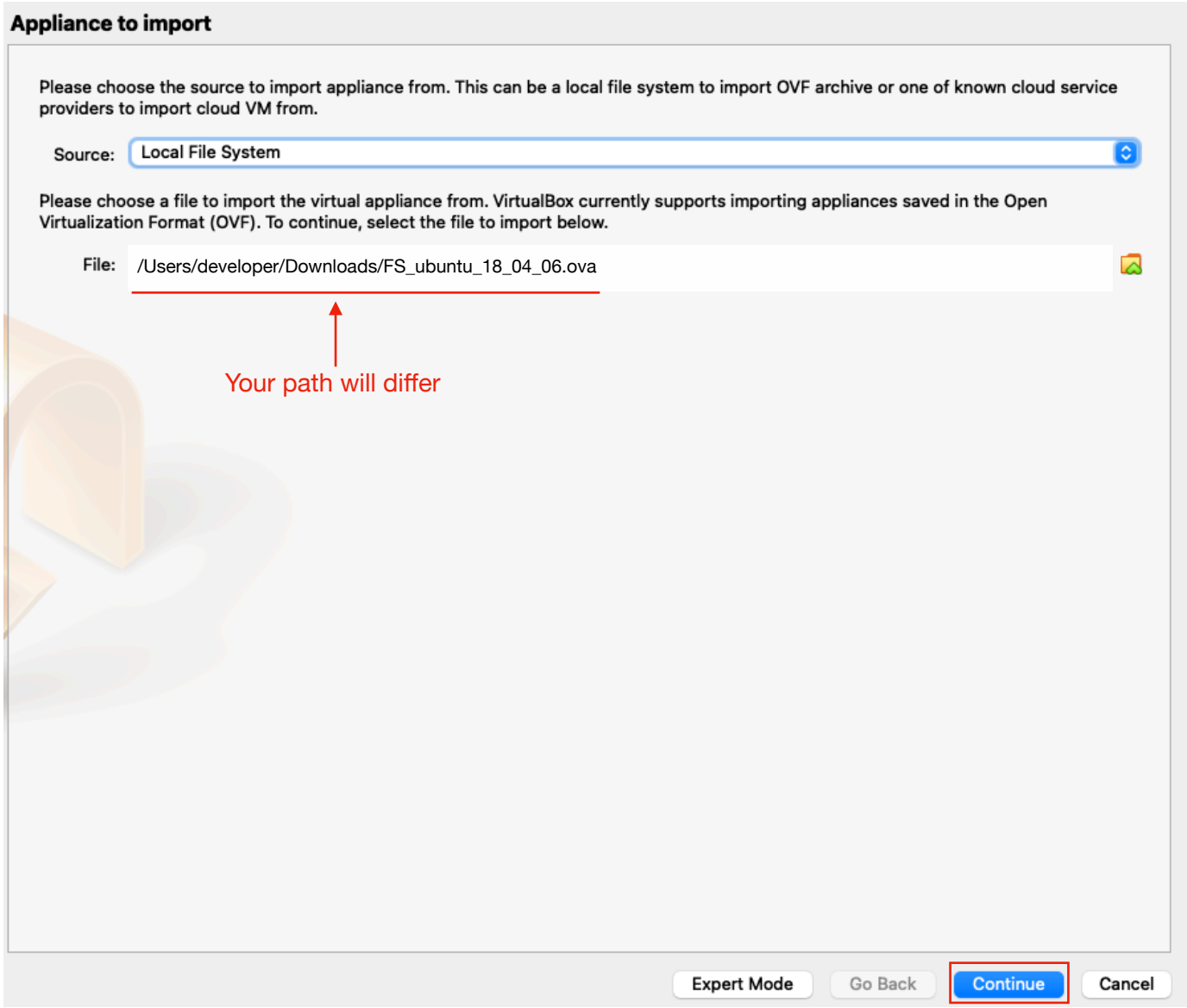
An appliance file will be used to create an Ubuntu linux image to run. From the “File” pull down menu select “import appliance”.

See the web page containing this document for the URL to download the virtual appliance file using your web browser. Most browsers are set to download files into your “Downloads” folder. Use the “Choose” icon to navigate to the downloaded file,

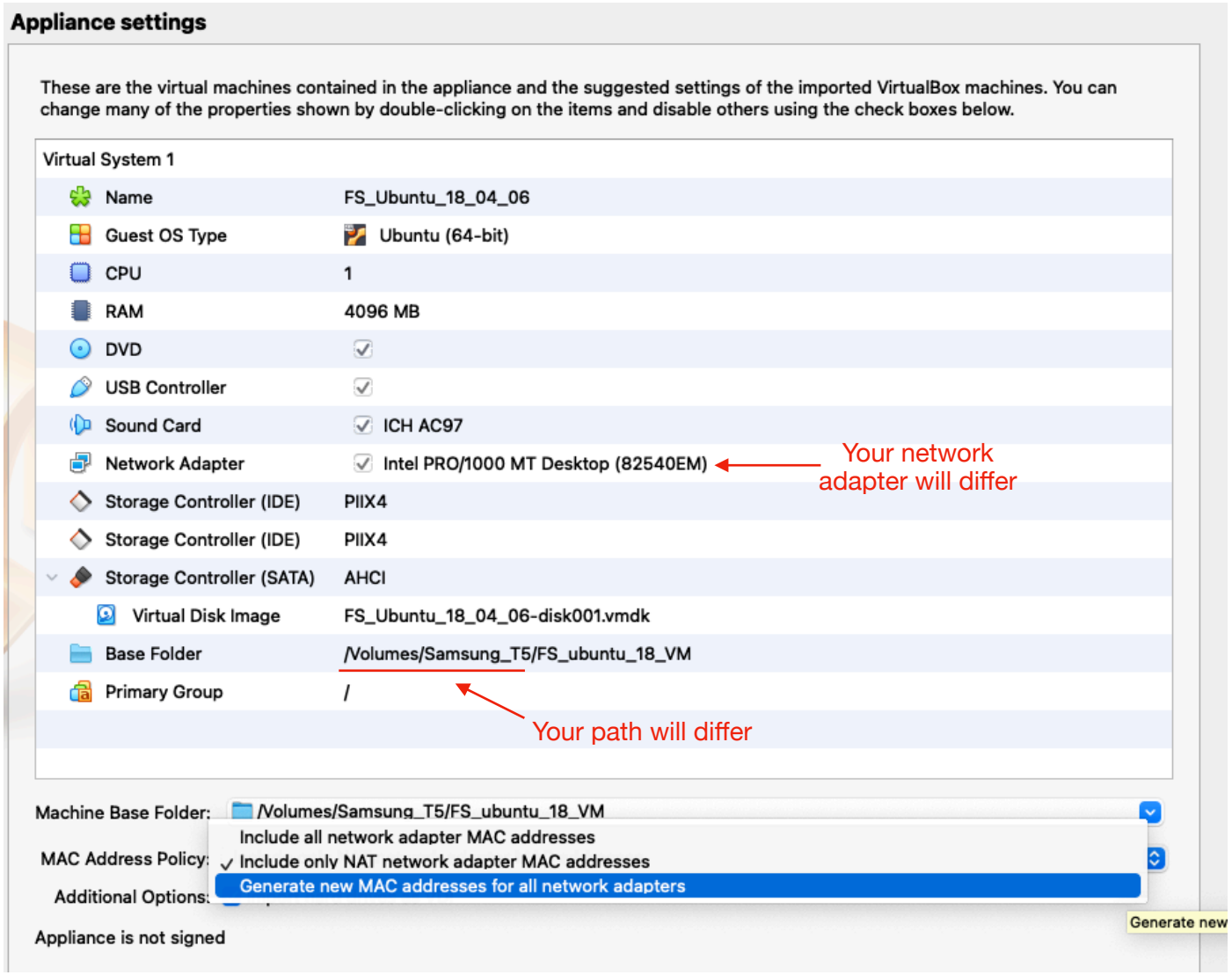




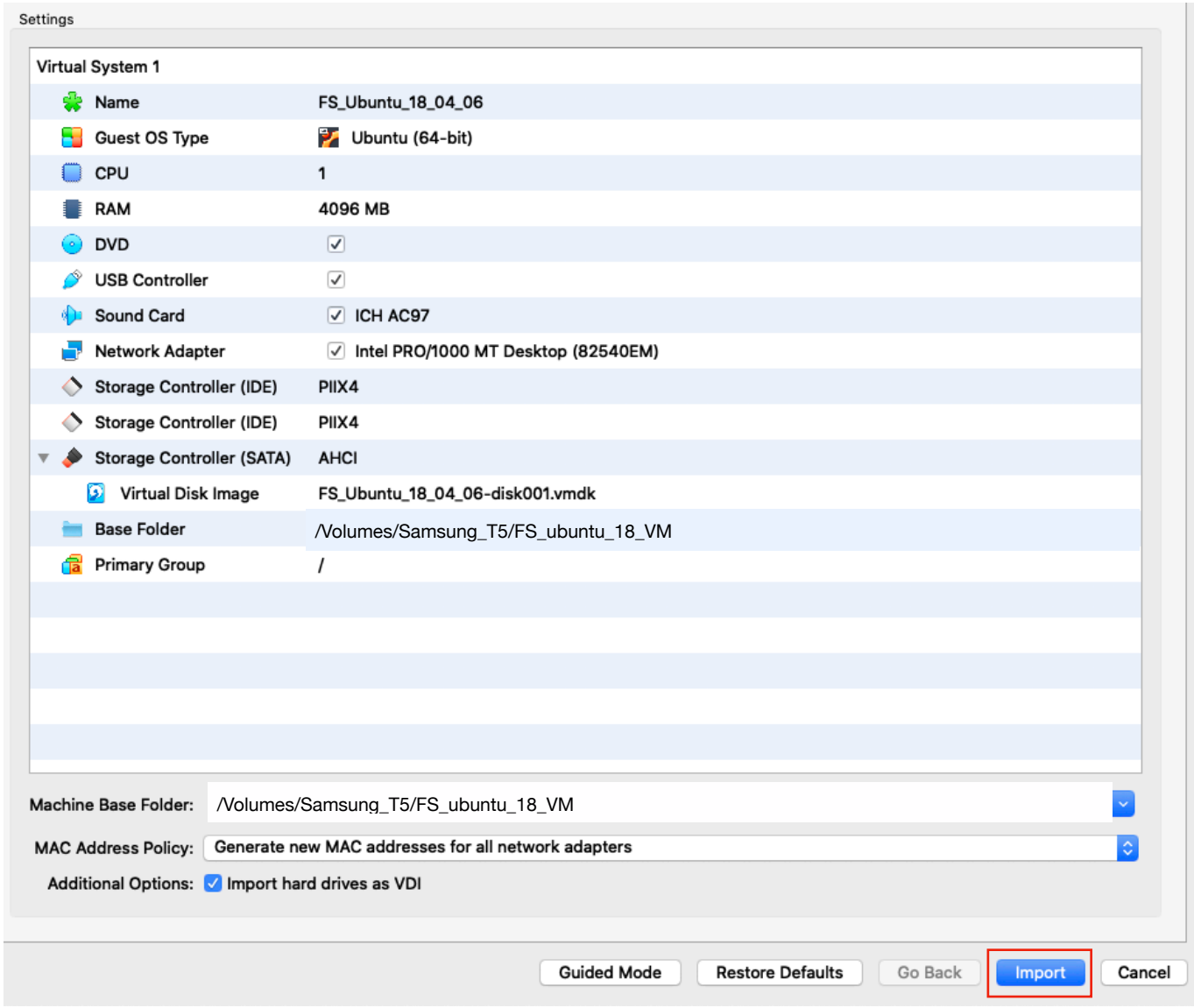
Once the path/filename of the appliance file is listed in the “File” field, then select “continue”.



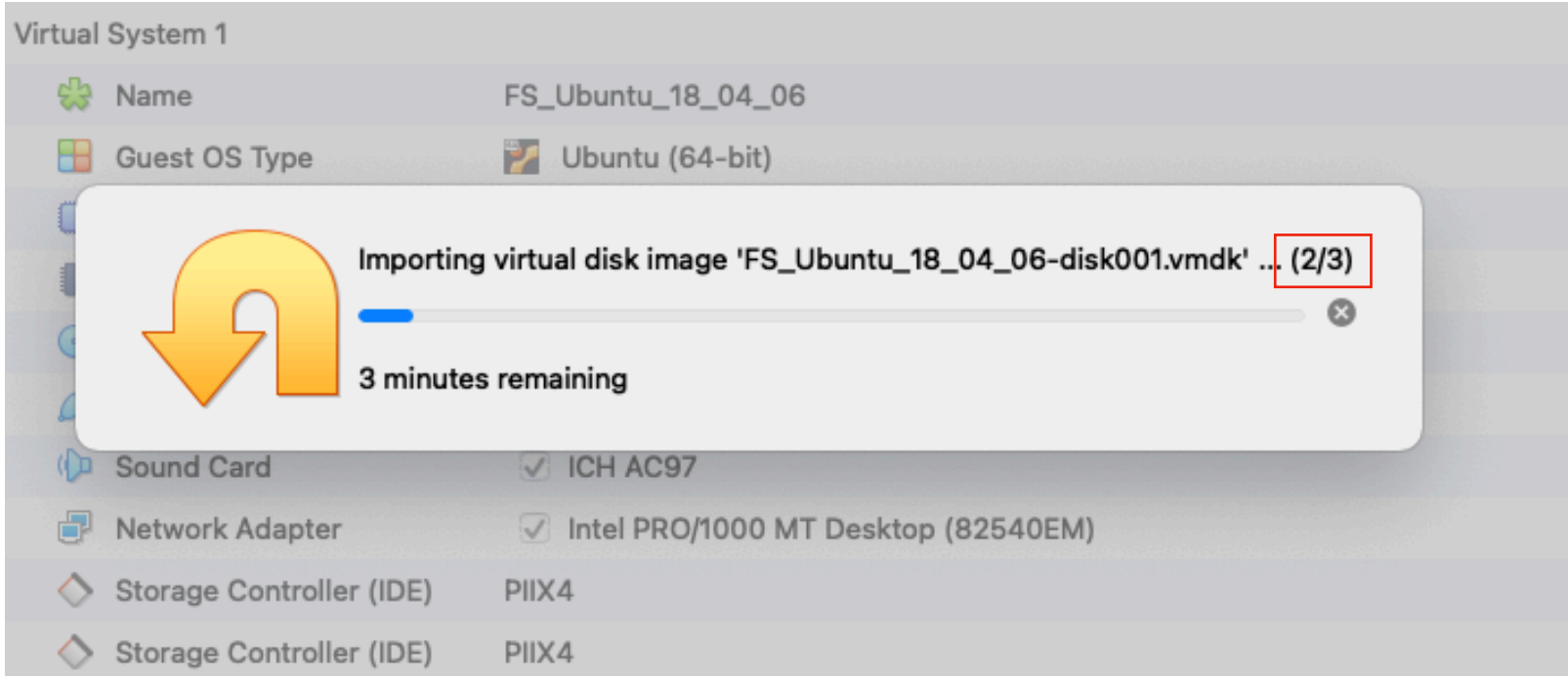
You will be presented with a window showing the current settings for the virtual appliance. Change the entry for “MAC address policy” to be “Generate new MAC addresses for all network adapters”.



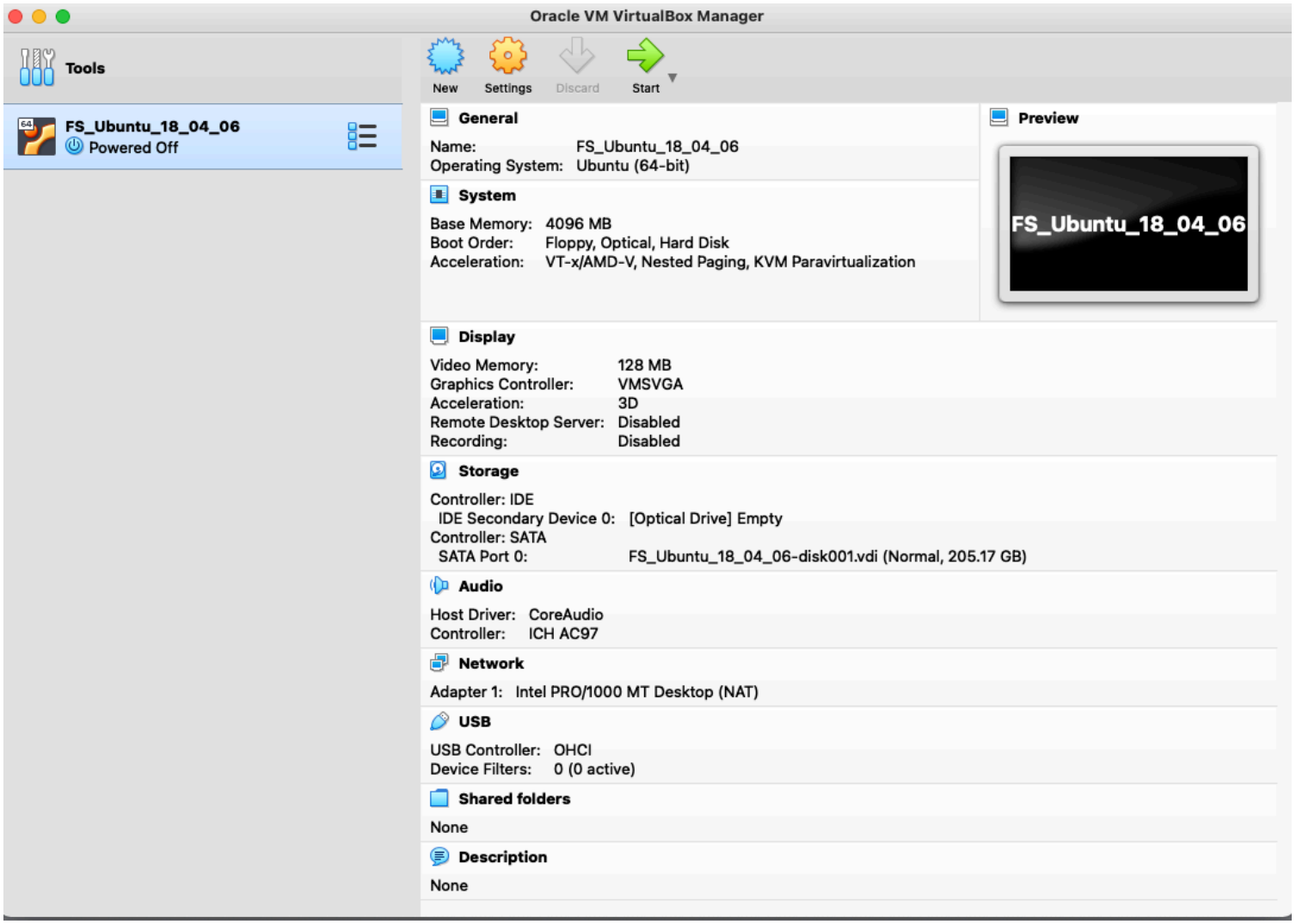
Select “Import” to create the virtual machine.



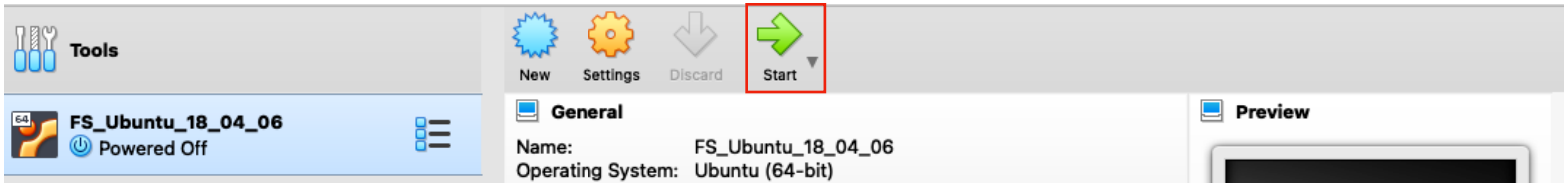
Wait for all steps in the import process to finish.



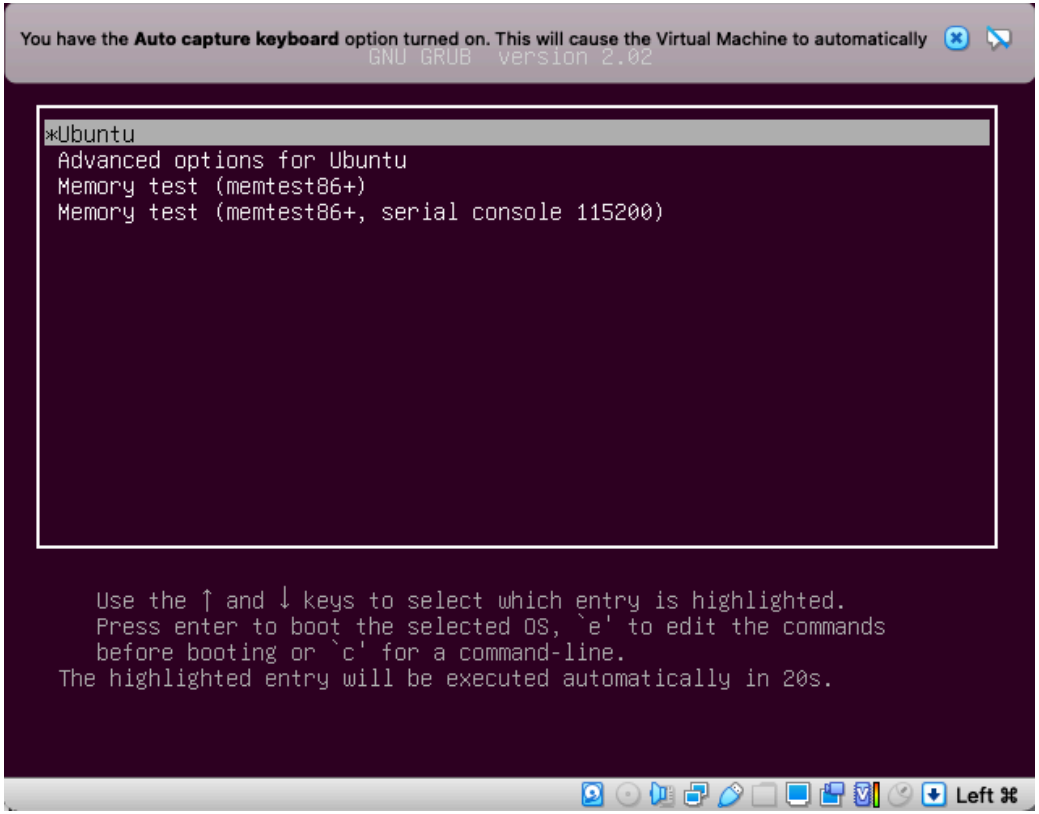
There should now be an entry for the virtual machine on the left hand side of the GUI with the current virtual machine configuration displayed on the opposite side.



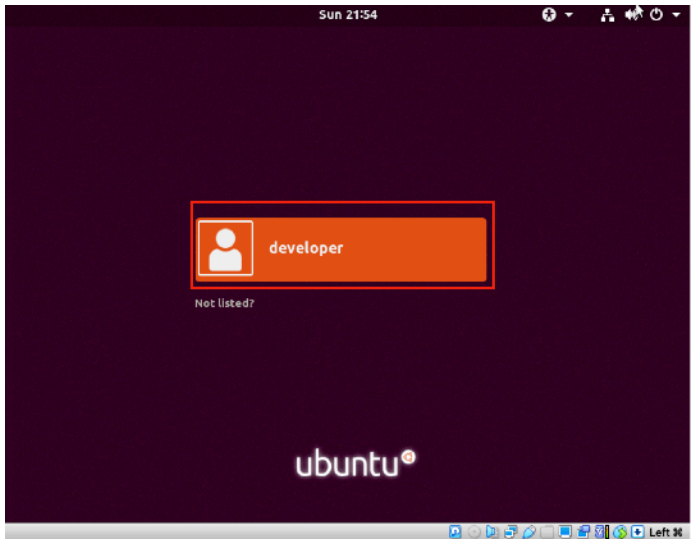
Start the virtual machine by clicking on the “Start” icon in the VirtualBox application.



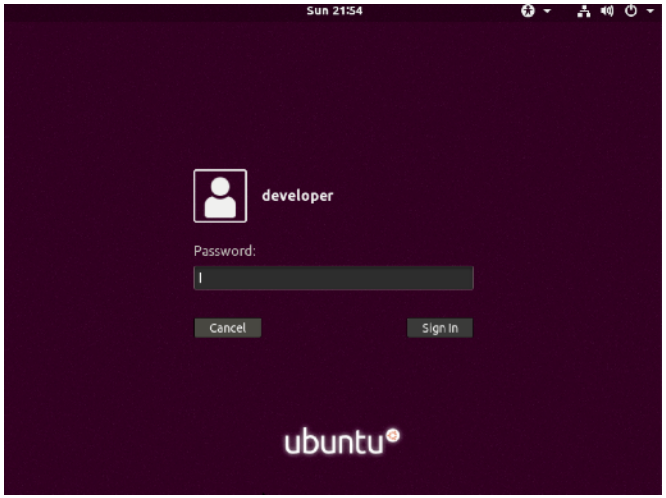
The Ubuntu boot menu should appear with the 1st choice, “Ubuntu”, highlighted. Hit return or wait for it to automatically boot.



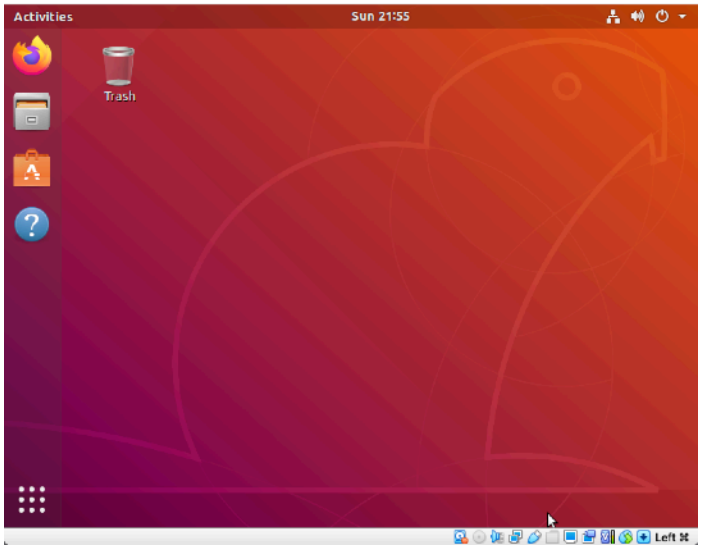
If the virtual machine fails to boot contact the freesurfer team and stop here. Otherwise, login as the user “developer” in the login menu. **Get the password by sending an email request to the freesurfer help list**.



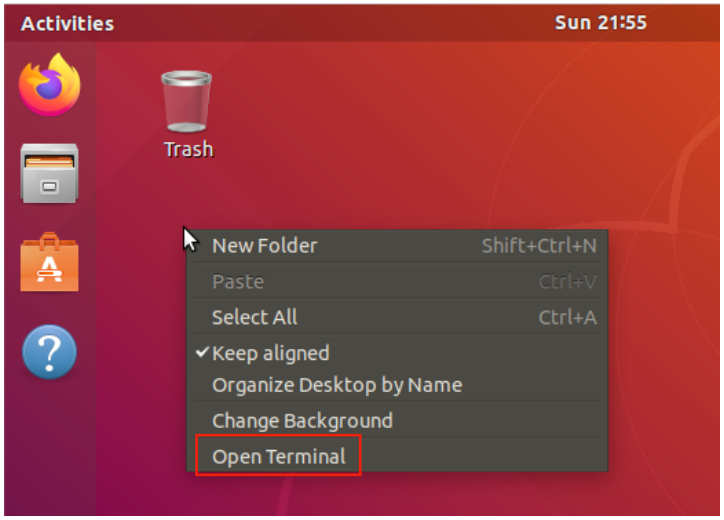
Enter the password.



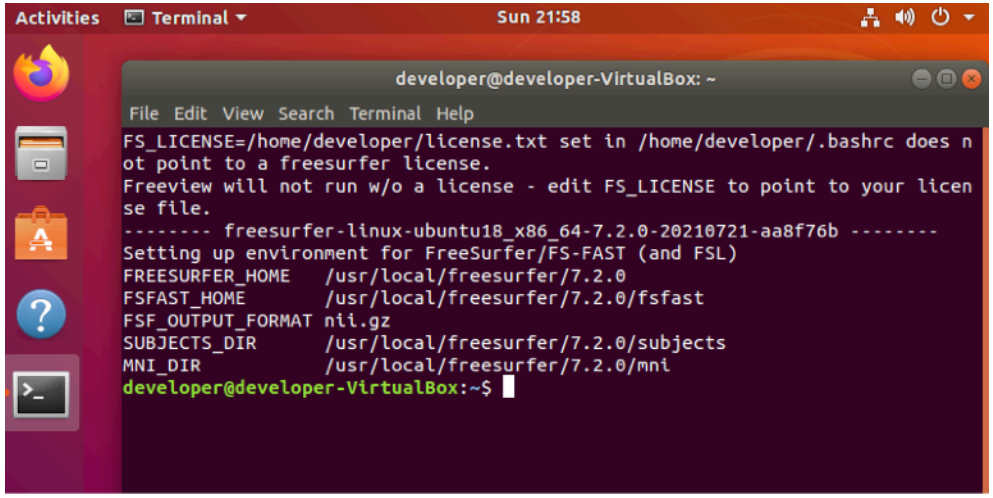
A blank desktop should appear after you login.



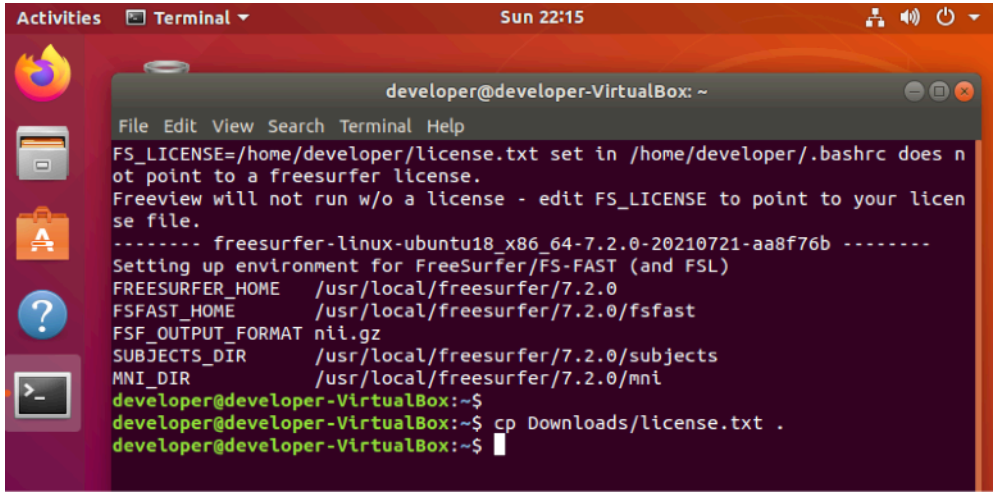
Right click with the mouse on the desktop and select “open Terminal”.



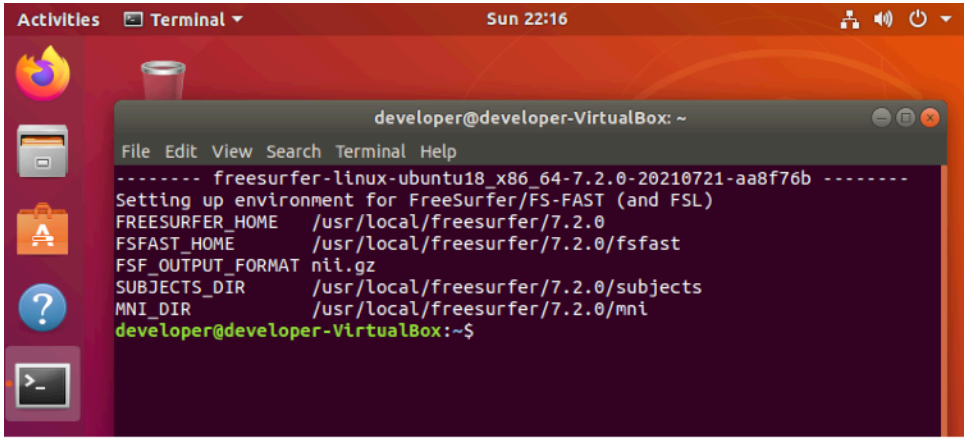
A new terminal windows should appear and notify you if a freesurfer license is missing. In the example below, no license was found. (**Obtain a free license file by filling out the form** at http://mail.nmr.mgh.harvard.edu/mailman/listinfo/freesurfer)



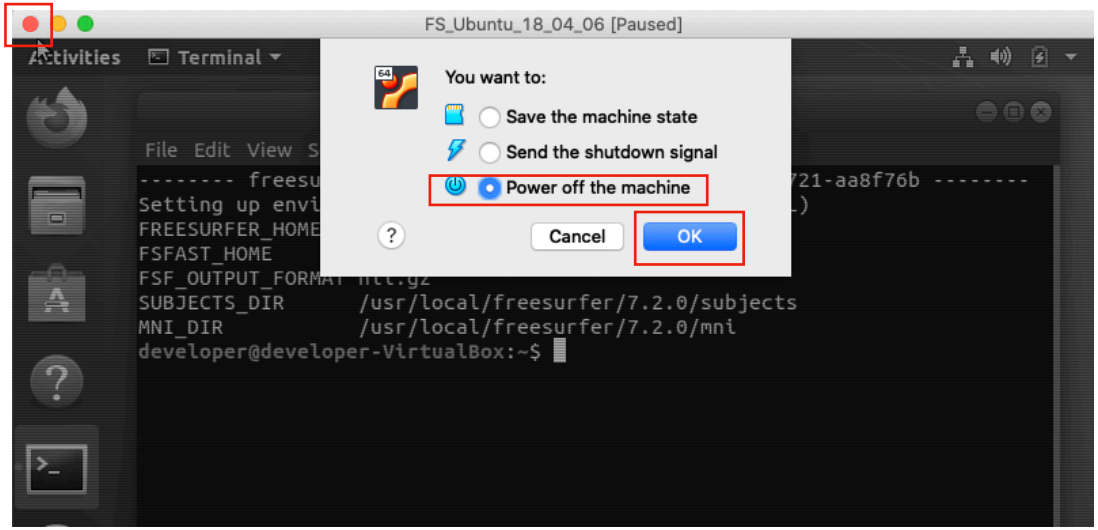
You can downloaded your license file, e.g., into your Downloads folder with a web browser. You can also try to cut and paste the text from license file or “drag and drop” the license file from the host machine into the VM (see end of this document). However you do it, add a valid “license.txt” file into the home directory for developer in the VM.



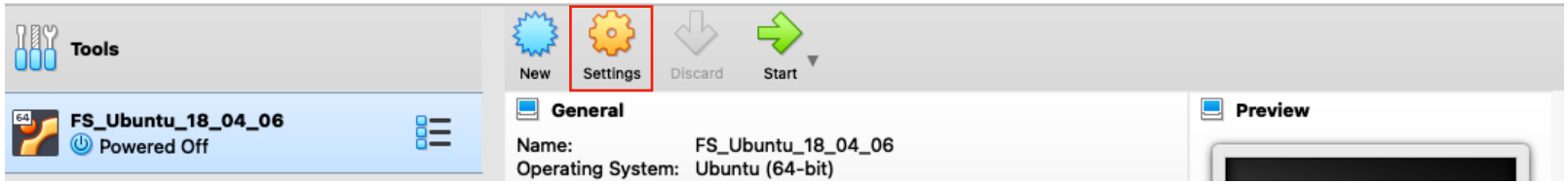
Close the current terminal window by clicking on the orange X in the upper right hand corner of the window. Repeat the step above where you right clicked on the empty desktop to bring up a new terminal window. The message about missing the license should be gone in the new terminal. **If your license file is still missing, review the steps above for the license file.**



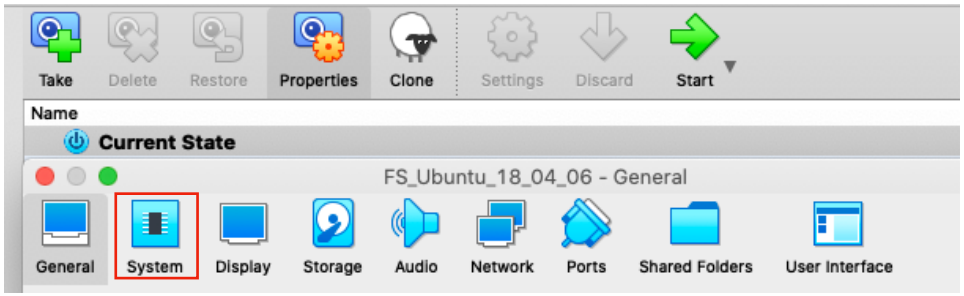
Power off the virtual machine by closing the VirtualBox Ubuntu window. On Mac OS this is the red circle in upper left hand corner of the window. On Windows this is the X in the upper right hand corner of the window. Check the entry for “Power Off”



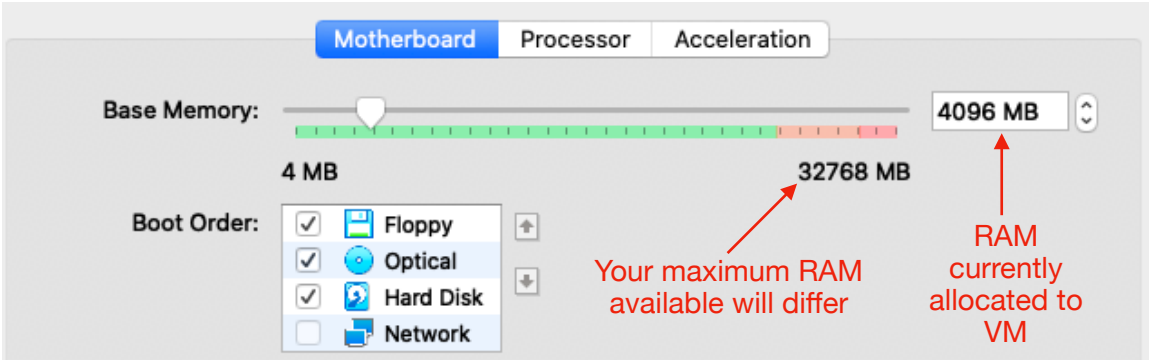
Now that you have verified the VM runs as is “out of the box”, some changes should be made to the VM to better run freesurfer. **With the VM still powered off, click on the “Settings” icon** as the top of the VirtualBox window.



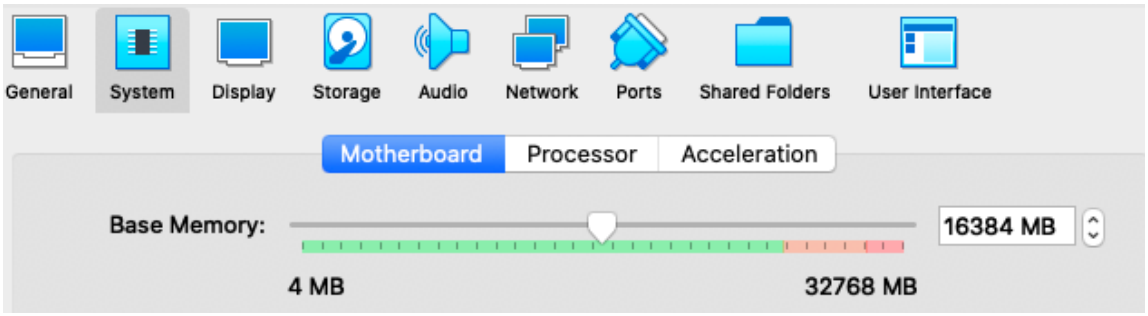
Click on the “System” icon to display the amount of RAM or “Base Memory” the VM can use from the host machine.



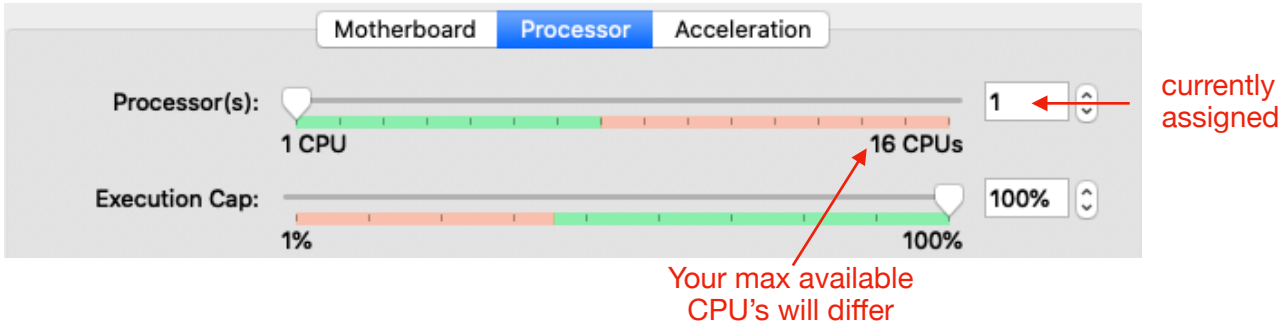
The VM has only ~4G of RAM “out of the box”. To the right hand side of the slider under the red part of the bar, you see the maximum amount of RAM available to the VM. Often no more than 1/2 of available memory is given the VM since the host machine may be running other programs.



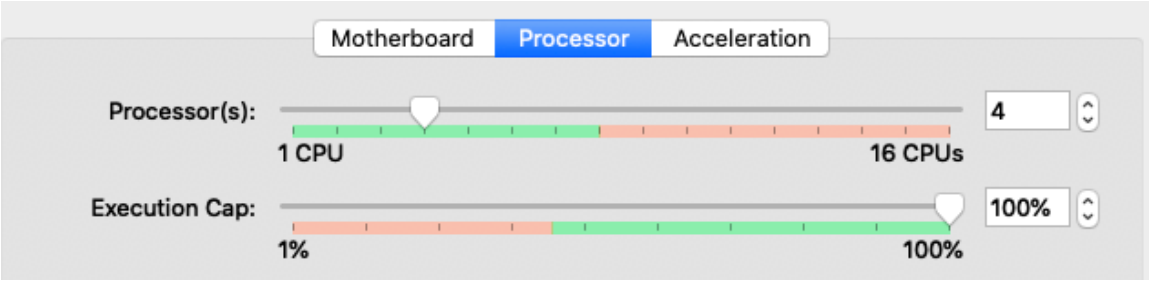
The recommendation for freesurfer is to **allocate at least 12G of RAM and if possible 16G to the VM**. If the total RAM available is 16G, then allocate 12G to the VM and try not to run other programs on the host machine when freesurfer is running. In the example below, 16G is assigned because it is 1/2 the total amount of RAM available on the host machine.



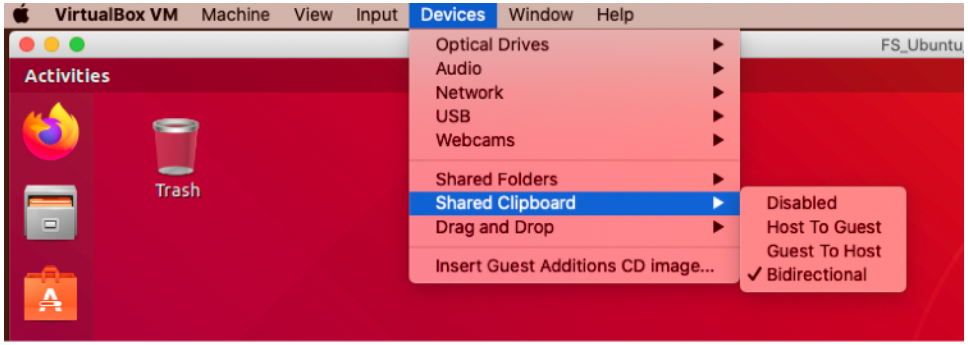
Performance can similarly also be improved by increasing the number of processors allocated to the VM. Click on the “Processor” tab next to the “Motherboard” tab. The VM has only 1 CPU “out of the box”. To the right hand side of the slider under the red part of the bar, you see the maximum amount of CPU’s available to the VM.

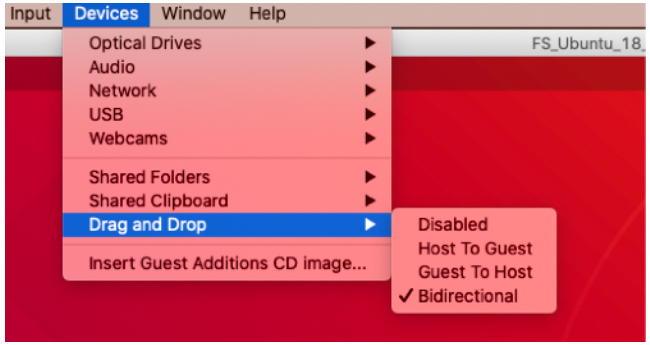


The recommendation for freesurfer is to **allocate at least 2 CPU's and if possible 4 CPU's to the VM**. If the total CPU's available are 2, then allocate 2 CPU's to the VM and try not to run other programs on the host machine when freesurfer is running. In the example below, 4 CPU's are allocated. (In the example below, there are 8 physical cores and 8 virtual cores via hyperthreading).

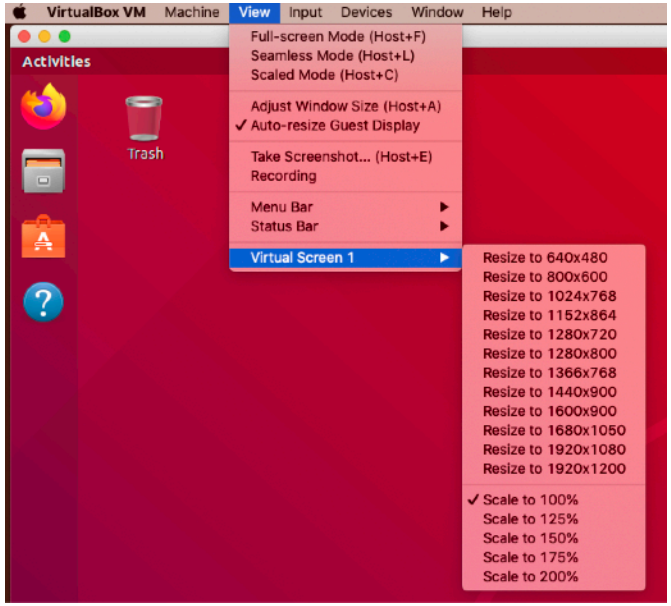


The guest extensions are installed in the VM. These allow for: (1) bi-directional cut and paste between the host machine and the Ubuntu linux window; (2) drag and drop files between the host machine and the Ubuntu linux window; (3) resize the Ubuntu linux window;. **Change these settings while the VM is running**.

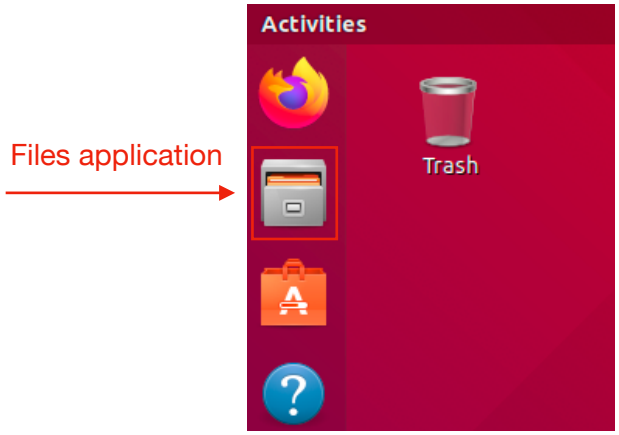


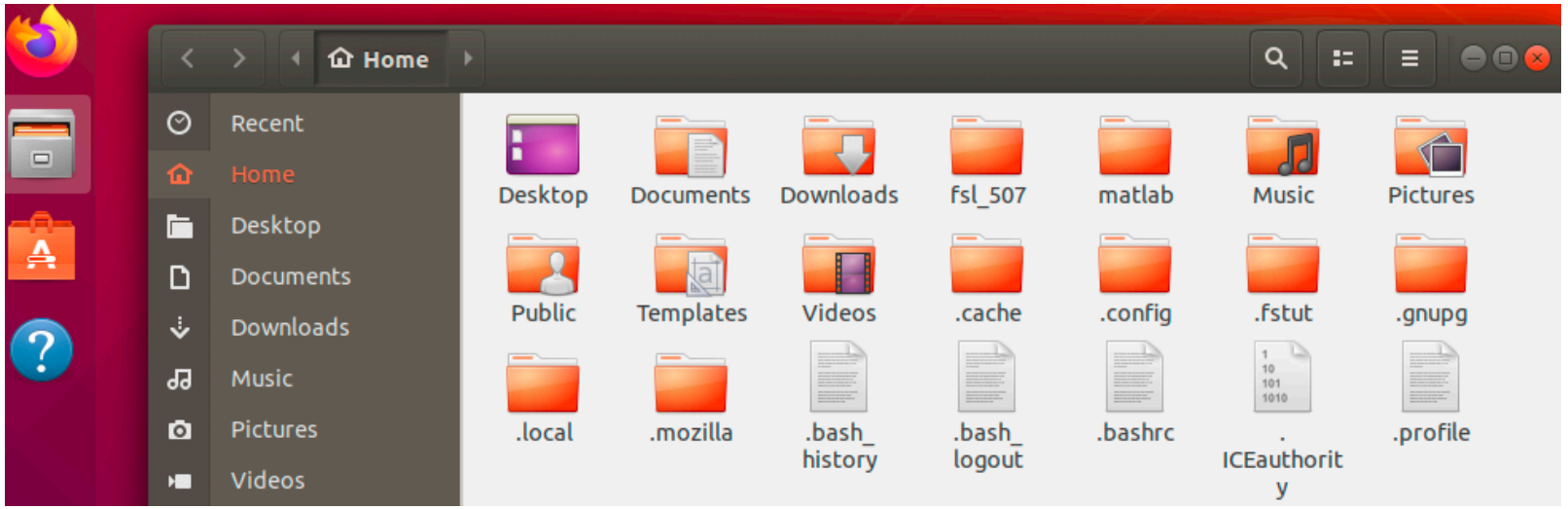


Try **selecting a specific "Resize to** …" dimension available in the pull down menu. With **Auto-resize** set, it works on some hosts to manually resize the Ubuntu linux window by dragging on a corner to enlarge it. But this may not work with some host graphics hardware if the window is re-sized to non-standard dimensions. Re-sizing only takes effect after you login.

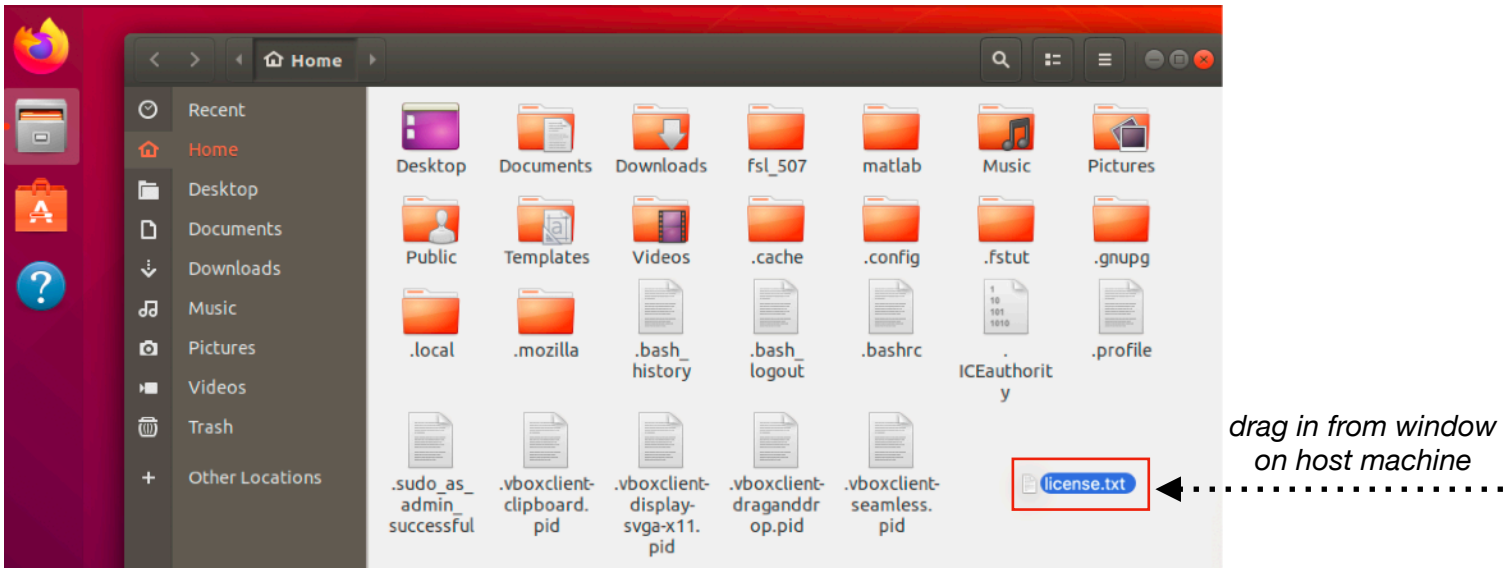


To **drag and drop files from the host machine into the VM**, first single click on the file cabinet icon on the left hand side of the desktop in the Ubuntu linux window. This will open the Ubuntu "Files" application which is the equivalent of the "Finder" (MacOS) or "Explorer" (Windows) in Linux. It will display the files in the home directory for userid developer.

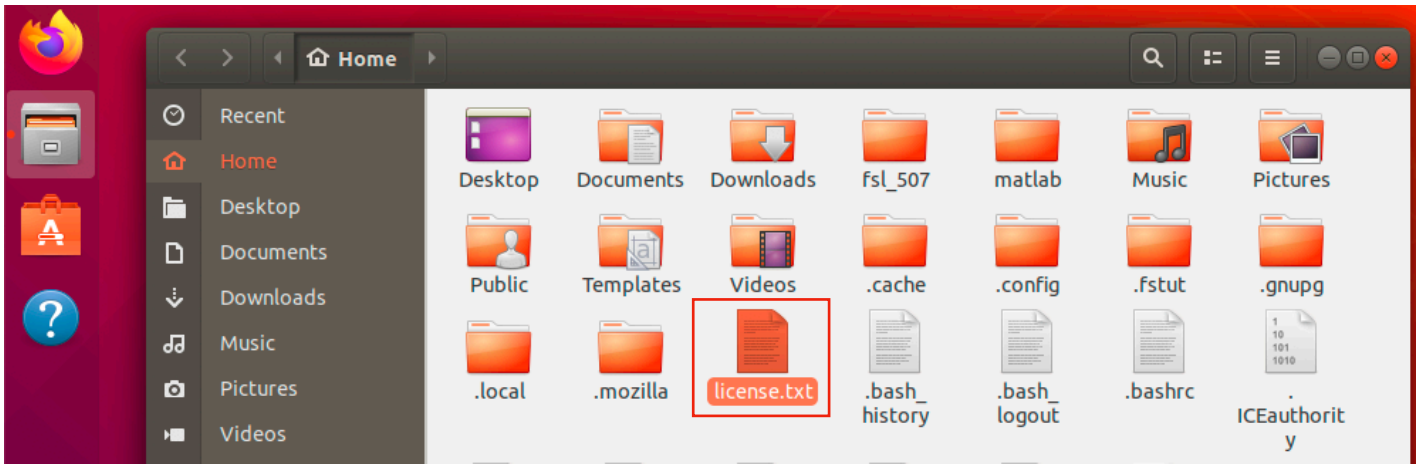




You can (single click and drag) a file from the host machine, e.g., from MacOS Finder, Windows Explorer) window, into the Files application in the Ubuntu desktop. You will see the name of the file while dragging as the mouse hovers over the Files window.

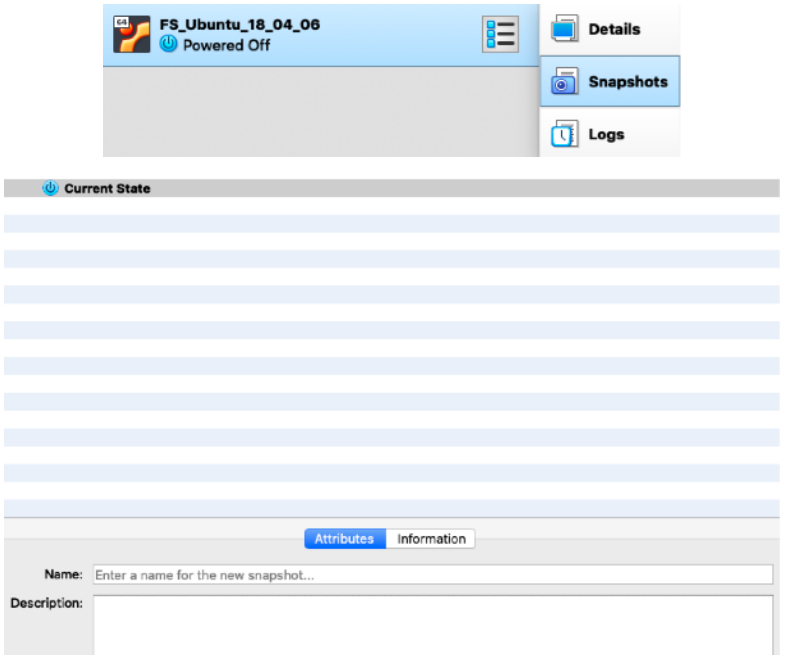


When you release the mouse the license.txt file icon appears in the Files window.

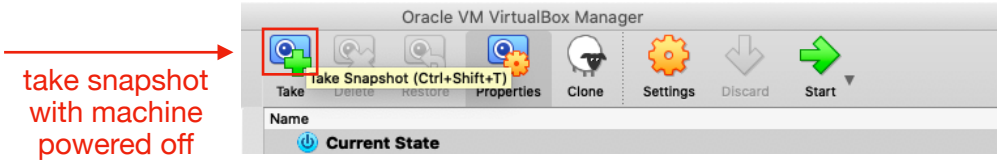


It is not necessary to use the "**snapshot**" functionality of VirtualBox in order to run freesurfer. However, taking periodic snapshots of the VM can be useful for backups and/or testing out changes as long as you **monitor available free disk space**.

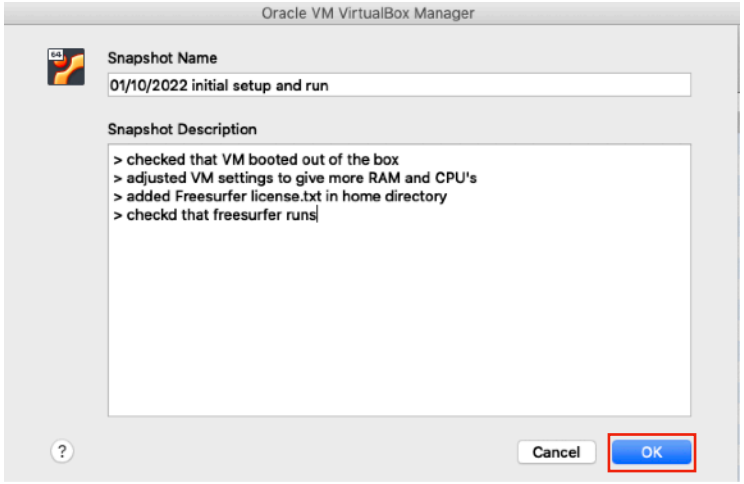
If you've taken no snapshots, then the "snapshot" view in the GUI will just show the "current state" of the machine. This means whatever you did between powering on and powering off the VM has been cumulatively saved into the current disk image of the virtual machine.



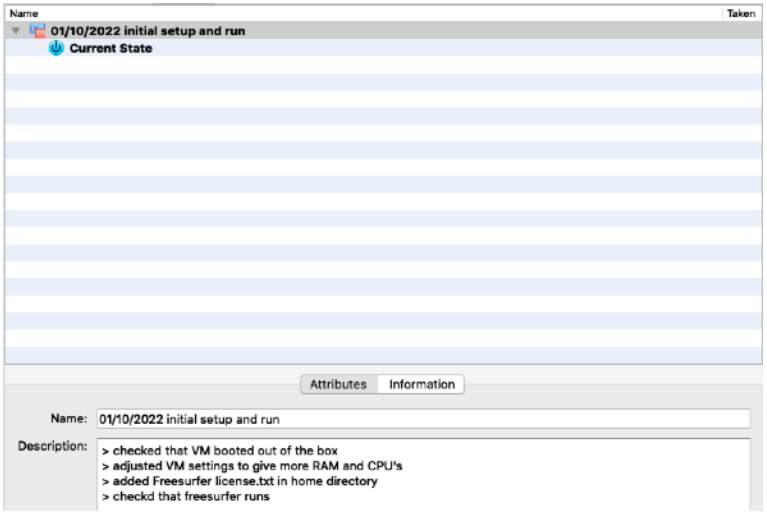
Taking a snapshot saves the current state of the system as you left it when you powered off the machine and allows the disk image for the VM to be restored to that state. You can create a snapshot with the machine powered off using the "Take" button.



It's a good idea to take some notes about the system when you make a snapshot. Hit "OK" to save the snapshot.



Once saved, VirtualBox will show the "current state" of the machine to be subsequent to or after the snapshot. You can revert to a snapshot prior to the current state of the machine by selecting the snapshot and selecting the "Restore" icon. VirtualBox will ask you what it should do before the restore if it thinks you will lose the current state of the machine.



You should **periodically check the folder where you told VirtualBox to create the VM** to ensure snapshots are not using up all the available disk space. Snapshots are delta files or the difference between the current state of the machine and the previous state of the machine. So while the first snapshot file saving the initial state of the system should be small, e.g., ~2MB, subsequent snapshot files could be large depending what files have been created in the Ubuntu VM.