

# Memo

To: Catherine Stokes  
From: William Matheson, W0229152  
Class: OSYS 1000, Section 701  
Date: April 12<sup>th</sup>, 2012  
Re: Final Project – Xubuntu 11.10 installation; Samba, VNC, SSH services

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## Xubuntu

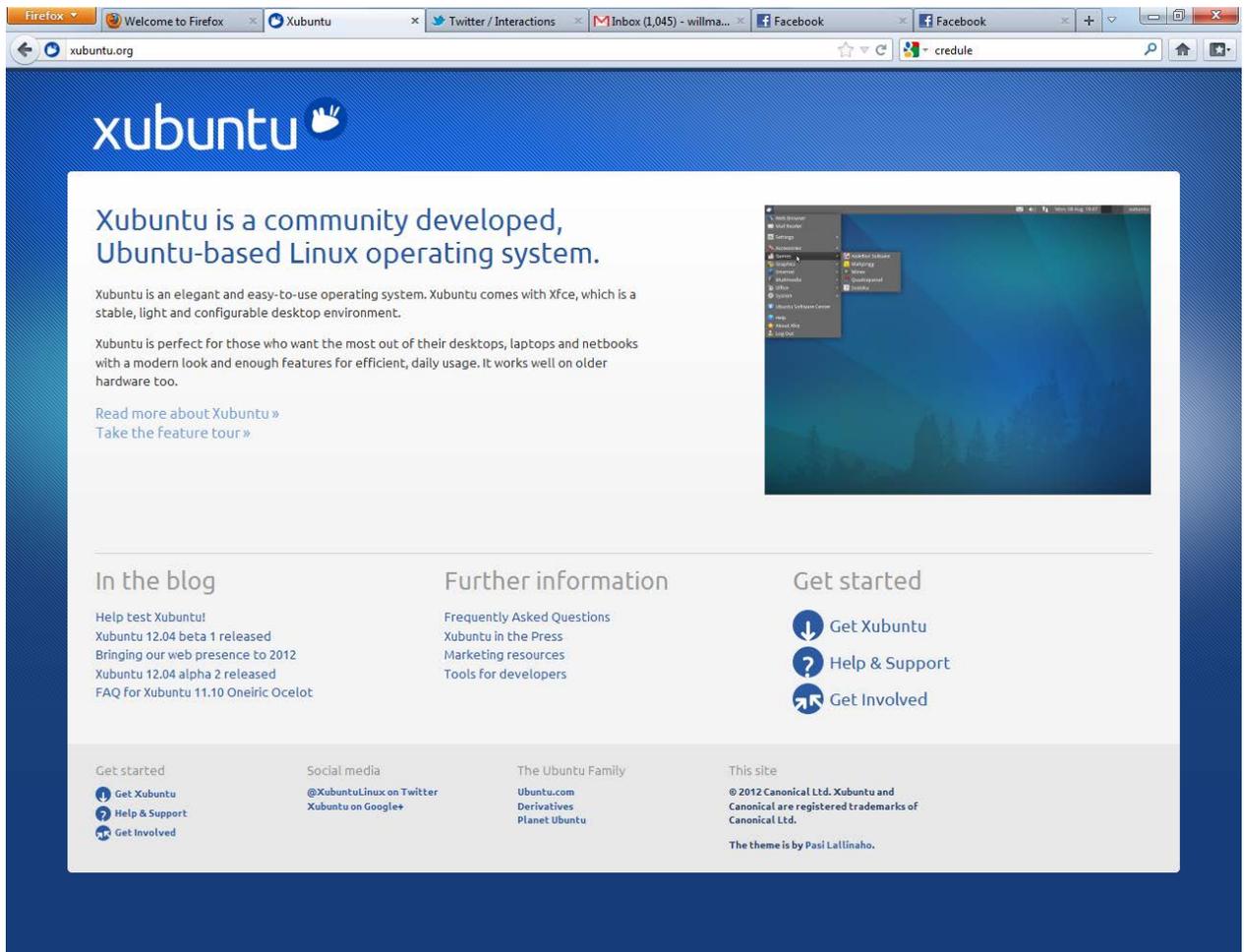
As stated on the distribution's [website](#), Xubuntu is a community-developed Ubuntu-based Linux operating system. It is essentially Ubuntu but configured to use Xfce instead of Unity. (Despite the name, it has the opposite effect – it actively drives people to other distributions.) Xfce aims to be fast and lightweight, yet be easy to use.

Before we get started, let's note that Xubuntu has no firewall configured by default. In many distributions, you'd have to open parts of the firewall to allow certain services to work. Here we don't have to worry about that, but if you're going to be using the system for more than testing purposes, you'll probably want to set up a firewall.

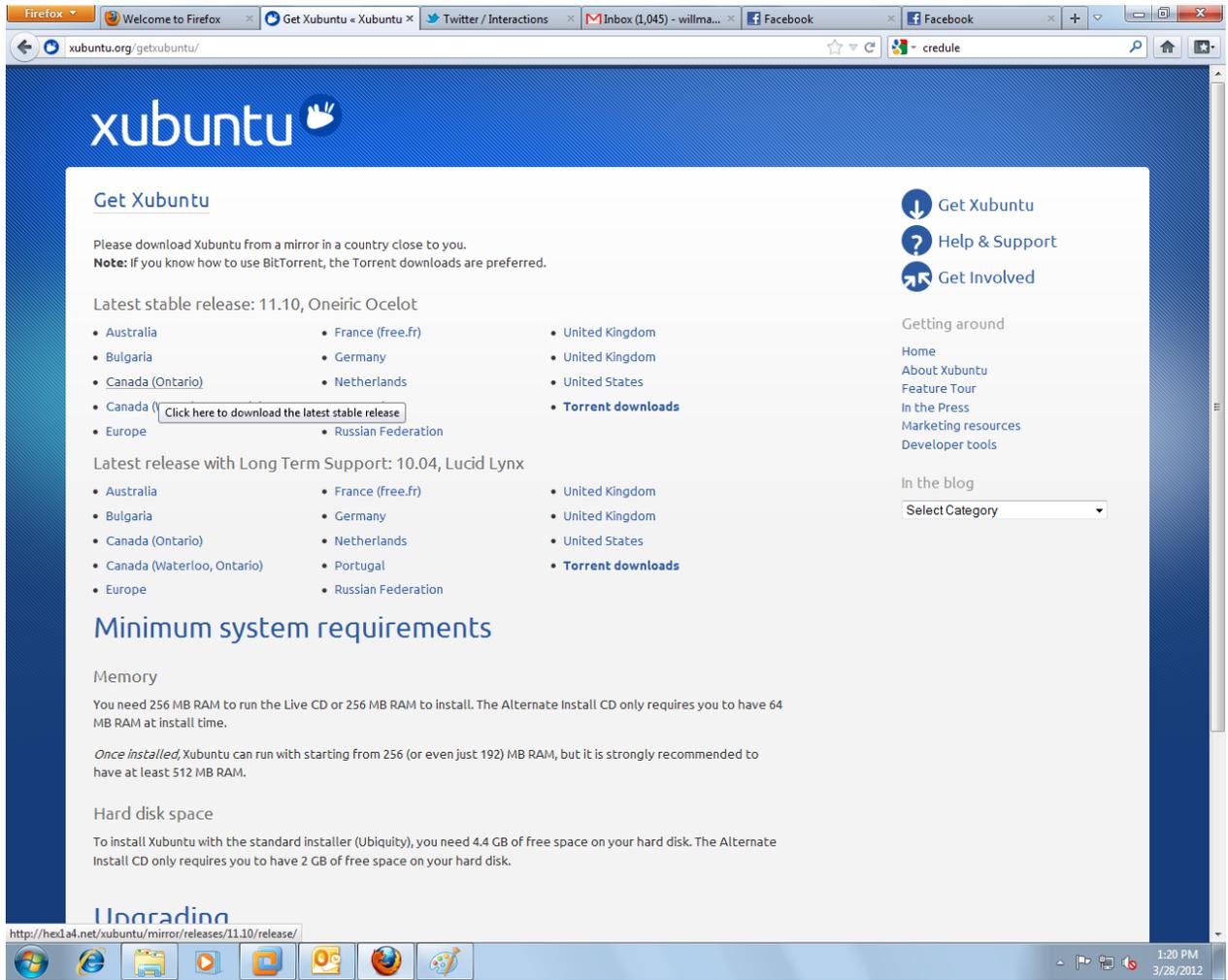
In this short memorandum, we will be:

- Installing Xubuntu (as a virtual machine) and getting the installation up-to-date (page 2)
- Making changes to the default Xubuntu disk configuration (page 29)
- Installing and using Samba (page 36)
- Installing and using VNC (page 39)
- Using SSH (page 46)

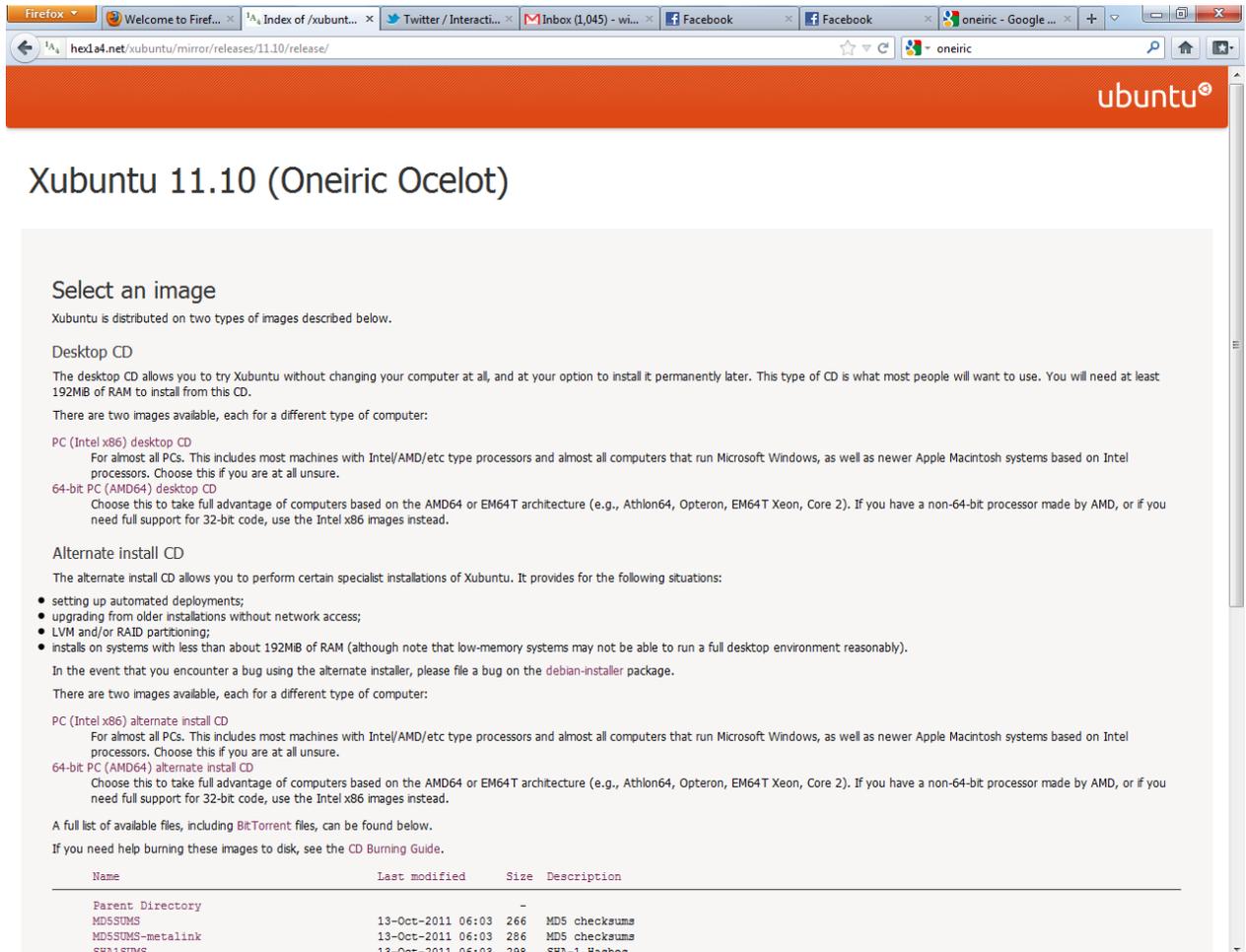
For optimal viewing in Adobe Acrobat, press Ctrl+L for full screen reading and use the arrow keys to move among pages.



You'll first want to visit [xubuntu.org](http://xubuntu.org) and "Get Ubuntu" (as of this writing, the link is under "Get started" on the lower right-hand side).

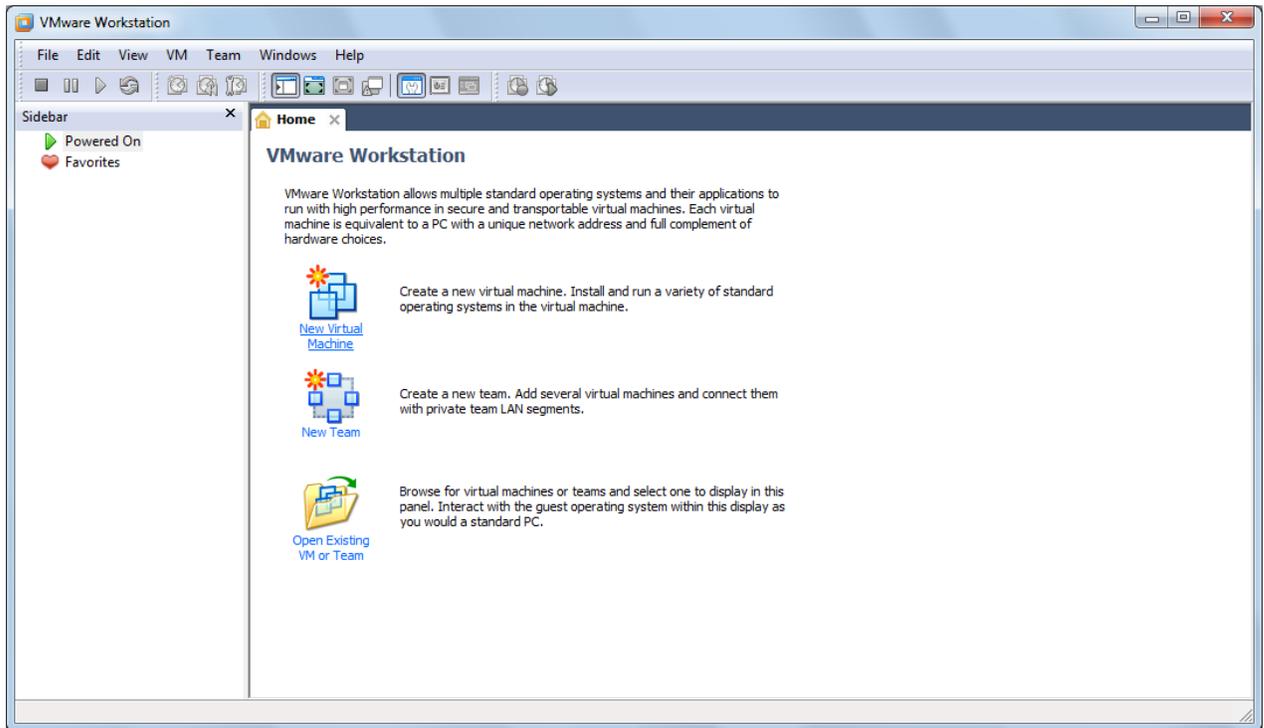


Then, select a server near you. Advanced users should try downloading directly from the PC in Linus Torvalds' basement.



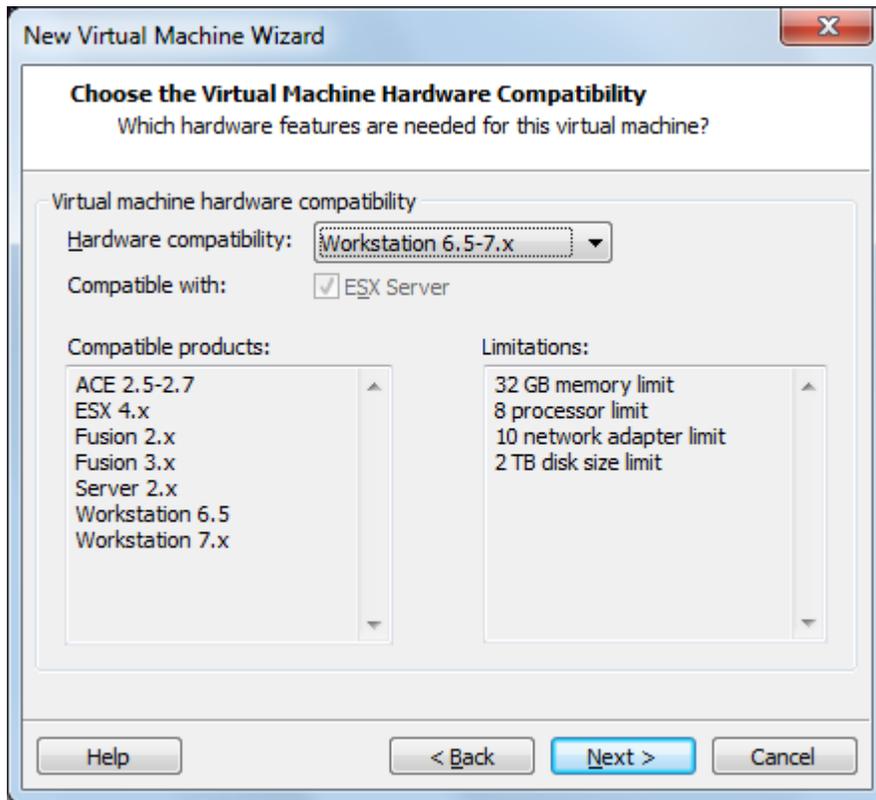
You'll be presented with a range of options. Since our installation will be a very simple one-off, we can simply download the "Desktop CD". We're going to use the "PC (Intel x86) desktop CD" because your Bedford author uses 32-bit host operating systems at both home and school, and virtualizing a 64-bit system would result in poor performance. However, if you exclusively use 64-bit hosts, or are planning a native 64-bit installation, feel free to choose the "64-bit PC (AMD64) desktop CD". Also, if you work for Intel, pretend that actually says `x86_64`.

The download will probably take a few minutes at the very least, so this is a good time to catch up on XKCD. Once the .ISO file (an image that CDs can be made from, or that can be mounted as virtual CD-ROMs) is downloaded, proceed to your native installation (you'll probably want to burn the ISO to CD-R) or a virtual machine installation. Below, we'll show you a virtual machine installation using VMWare Workstation 7.

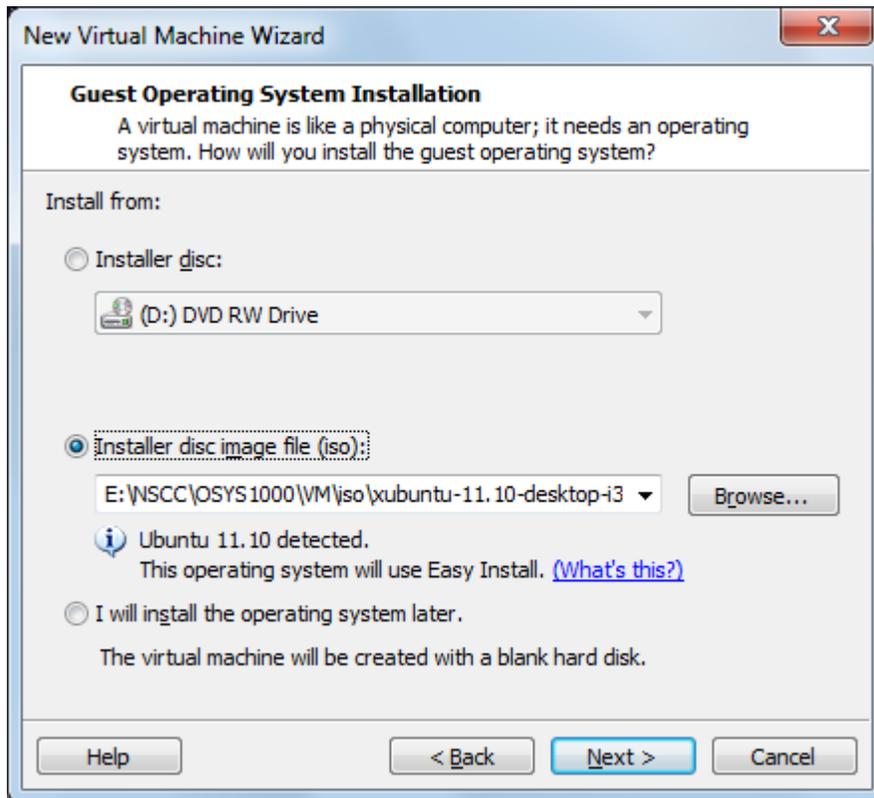


First, we want a "New Virtual Machine". The wizard below appears. Choose a "Custom" configuration.

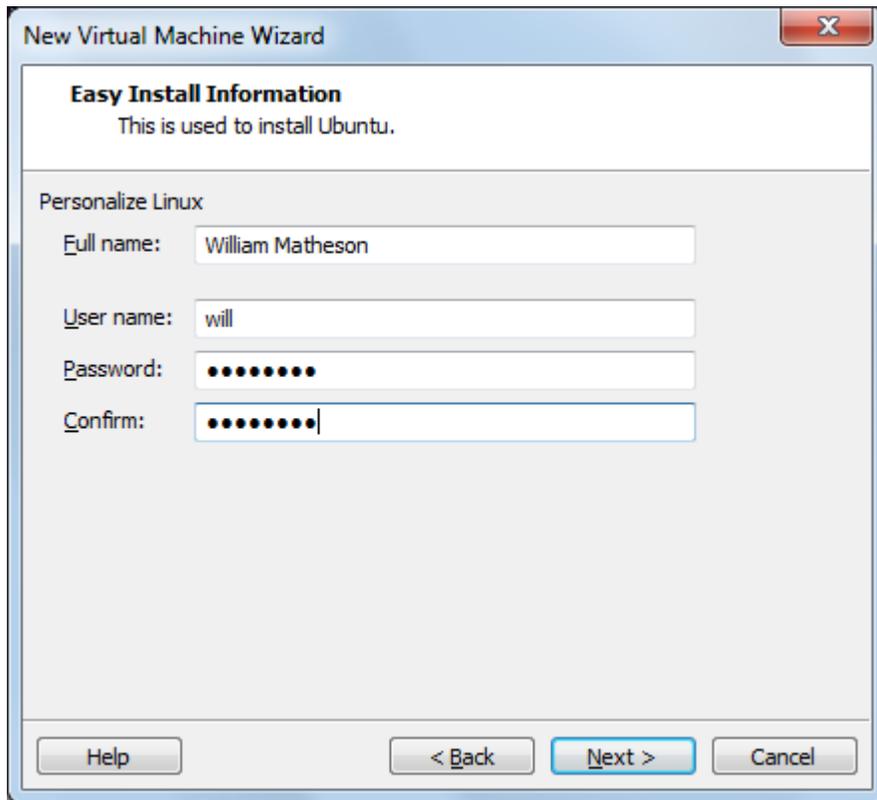




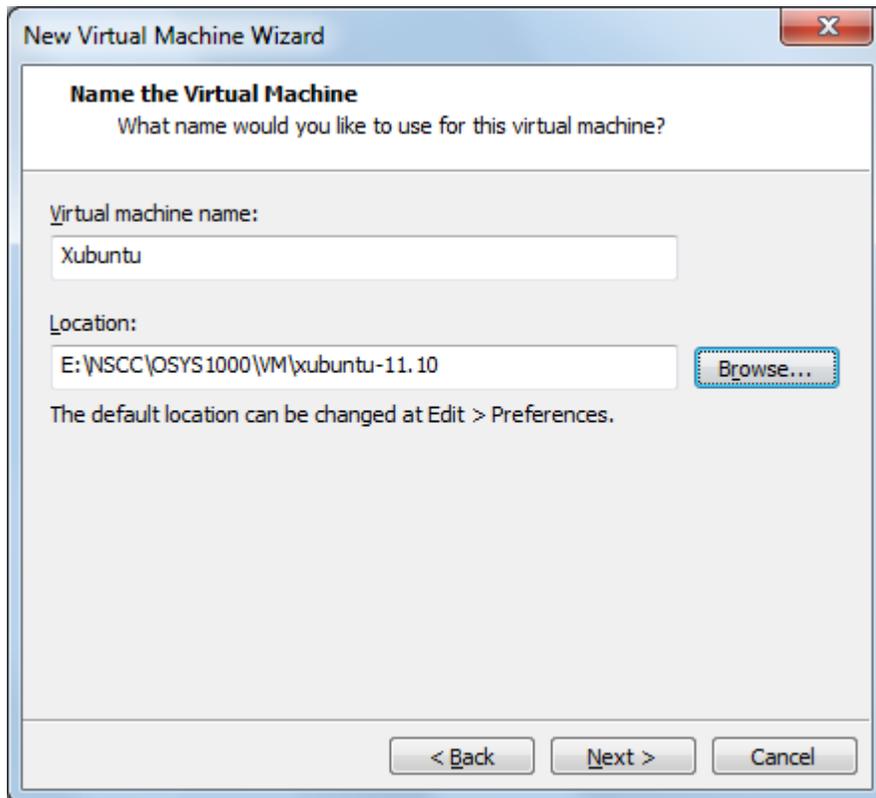
Generally, we'll be selecting the defaults. But in the screen below, it'll be your job to locate the ISO file that you downloaded earlier.



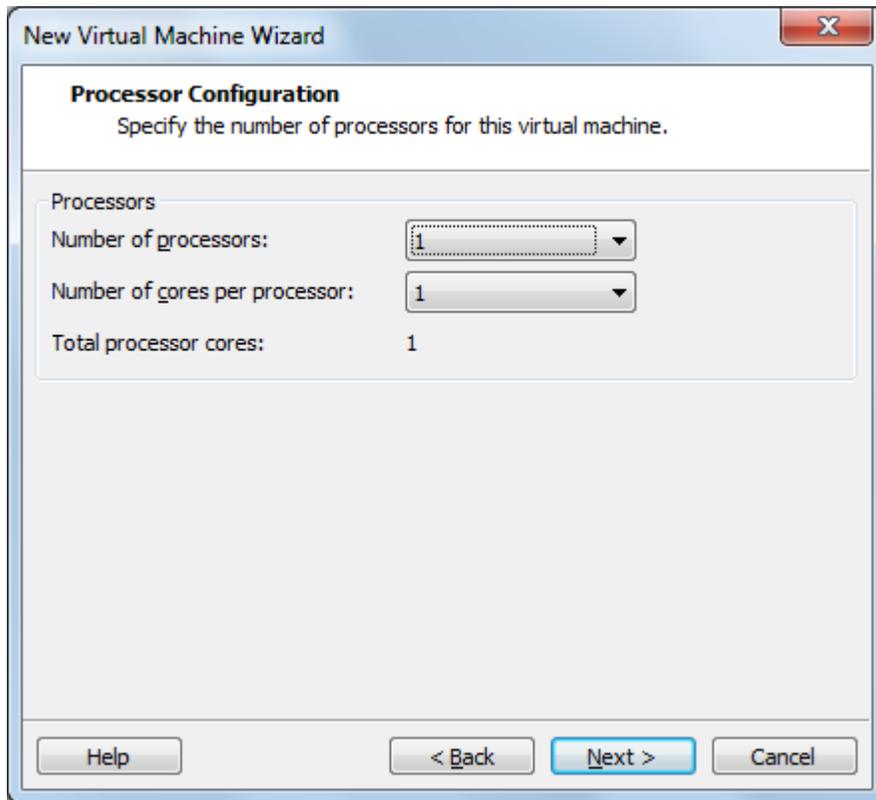
Browse for the “Installer disc image file” and VMWare should detect that it’s Ubuntu (derived). Most importantly, we’ll be able to use Easy Install. This reduces the inputs necessary to perform a successful installation. It also means that VMWare Tools will be installed automatically. You can run the virtual machine without VMWare Tools and/or install it later, but you will lose fancy features like drag-and-drop file transfer between VM and host, and automatic VM display resolution changes when you adjust the size of the window it’s running in.



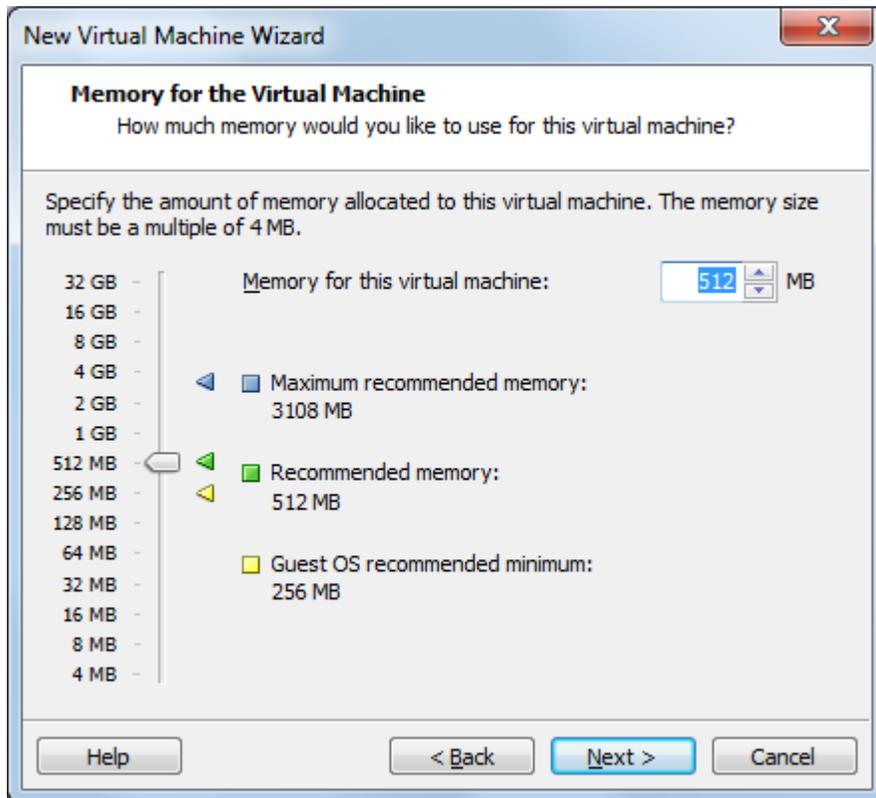
Easy Install will also set up your default user account! Enter something meaningful and memorable and proceed.



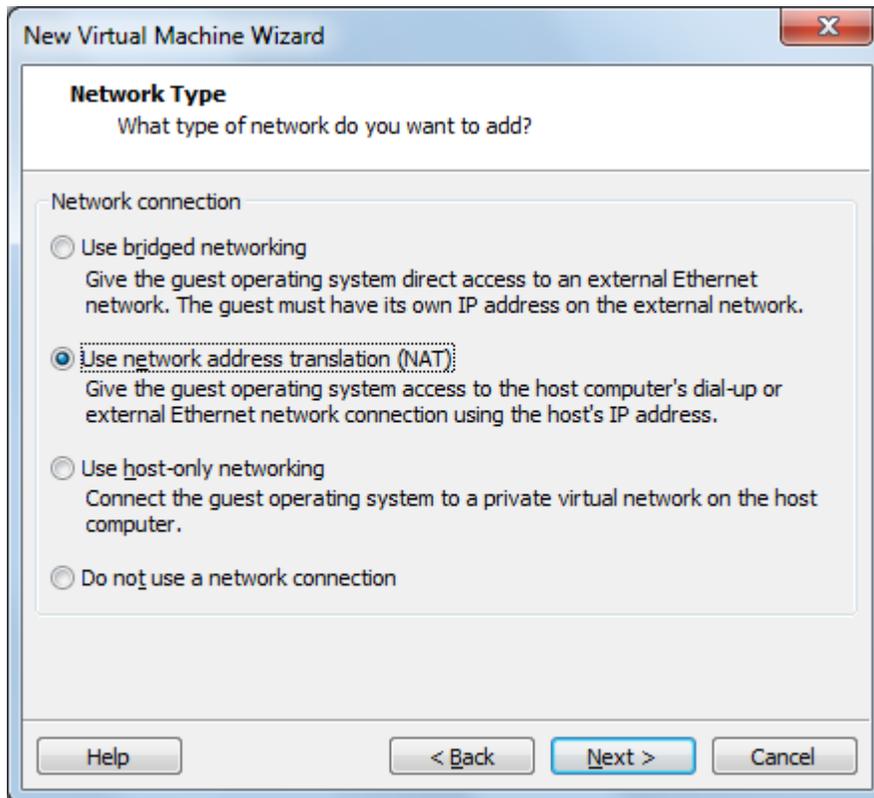
Name the VM and decide where to save it. You're going to want *at least* 20GB of free disk space for this.



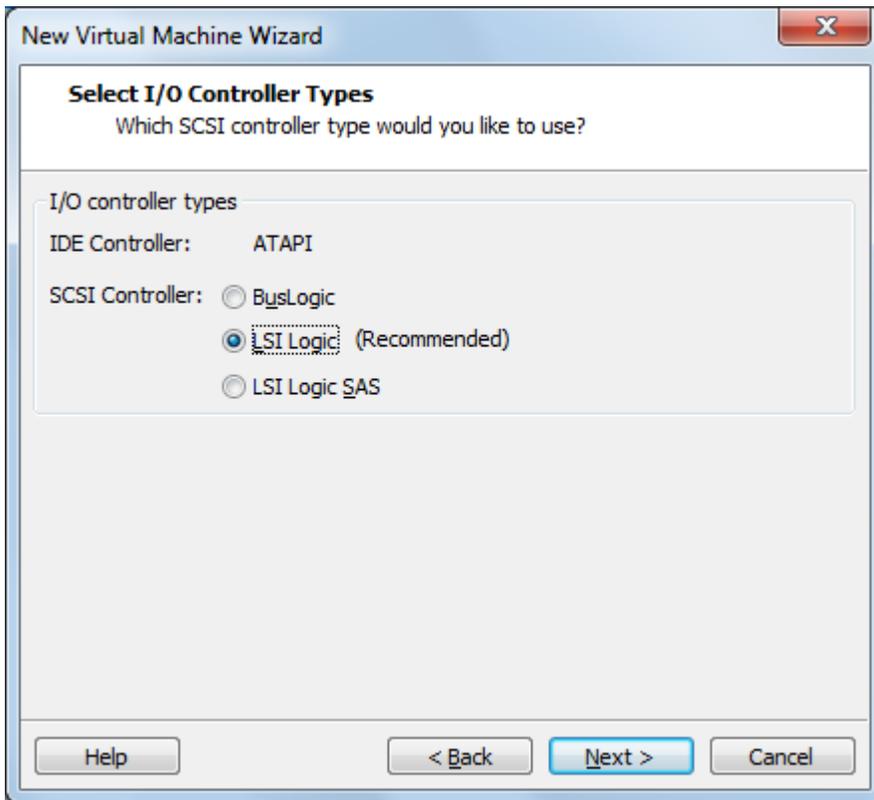
If you have a plethora of cores and/or processors to play with, by all means assign more than one. Generally, though, to avoid having to reconfigure, it's best to assign such resources according to what the least capable host you'll ever use will be able to provide.



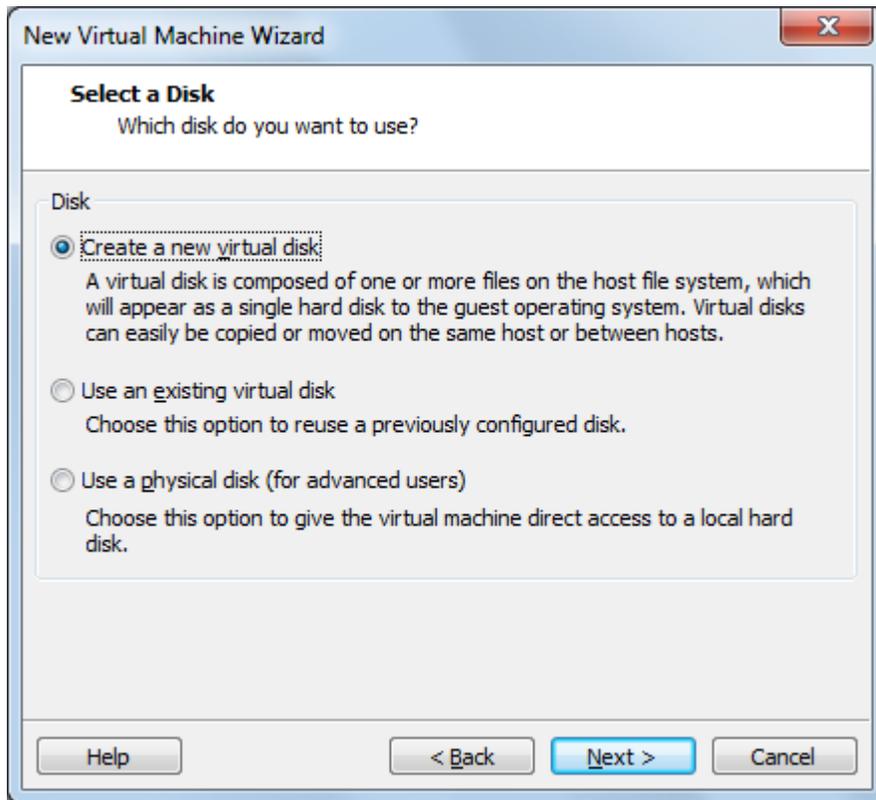
Assigning the recommended amount of RAM helps assure good performance (provided it is there for the host to give – if you ever have to dip into virtual memory while virtualizing (similarly named things but different concepts), be prepared for a painful ordeal). If you're working with a 32-bit installation, there's no point in assigning more than 4GB of RAM because 32-bit operating systems can't use any more than that.



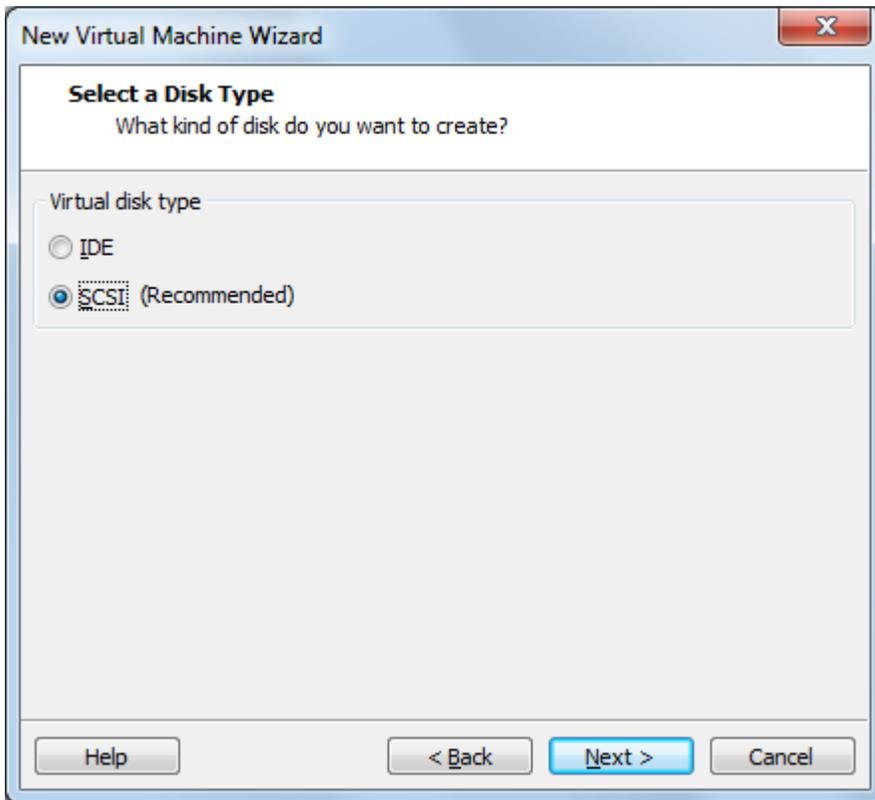
Unless you are applying for your [CCIE certification](#), accept the default networking settings.



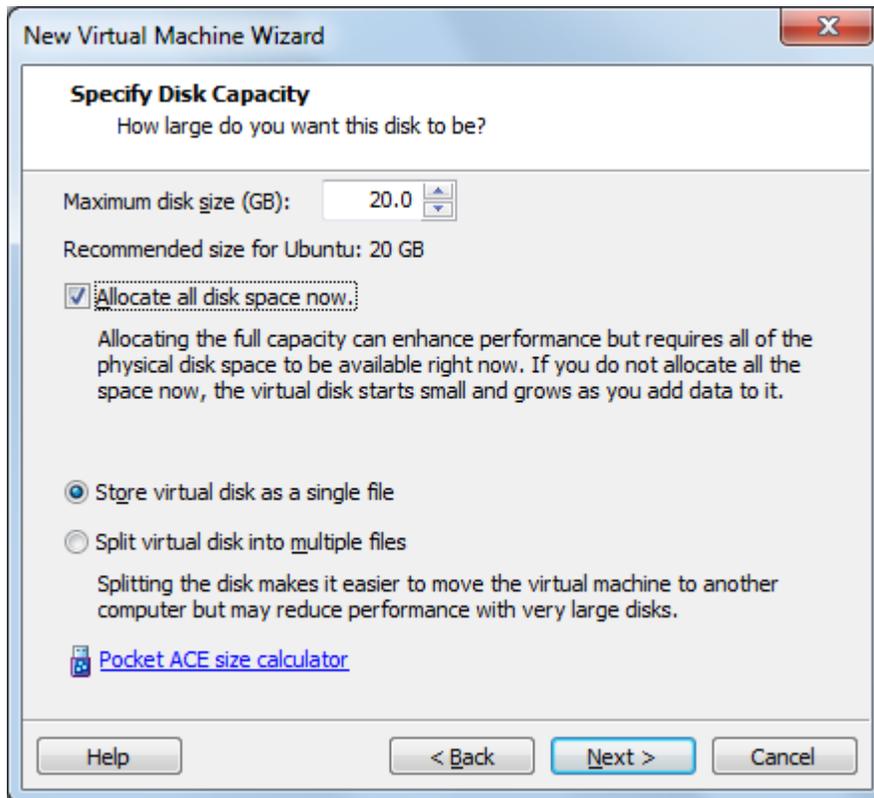
If the words "SCSI Controller" don't send shivers down your spine, consider yourself very lucky.



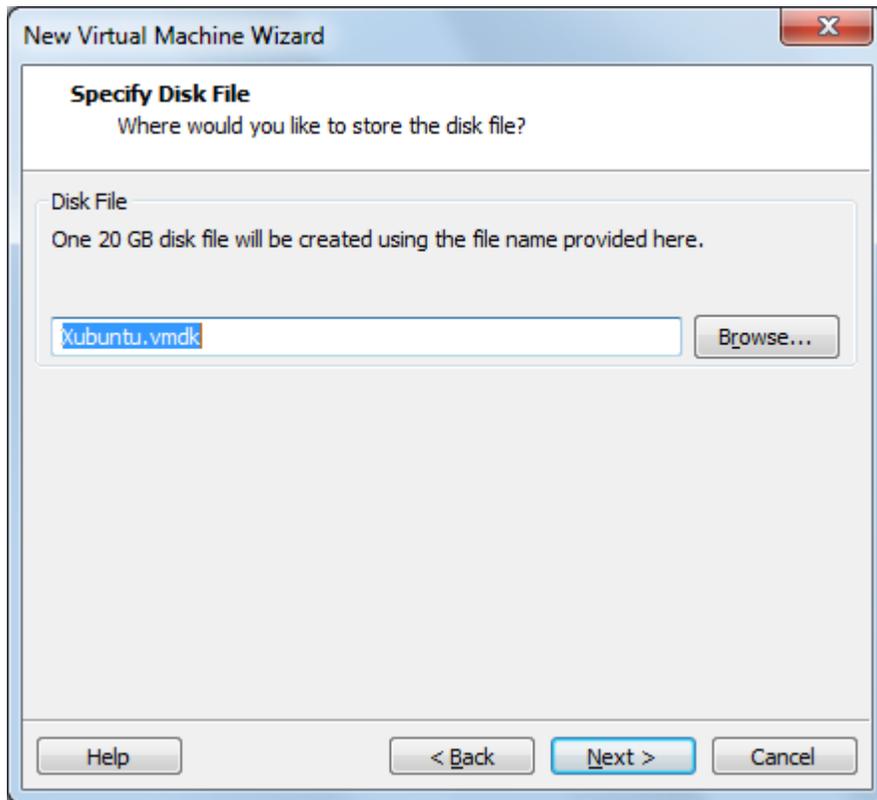
Assuming you don't have a virtual disk (file) ready, we'll create a new one.



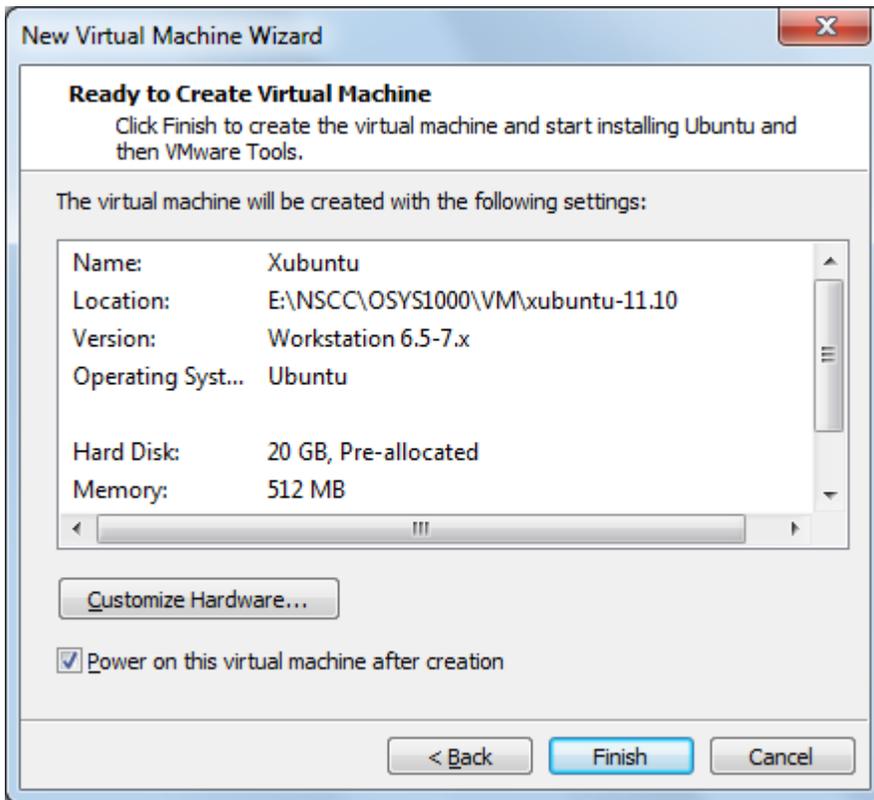
Unless you're doing this for Alternative Lifestyles Weekly, avoid IDE and go with SCSI.



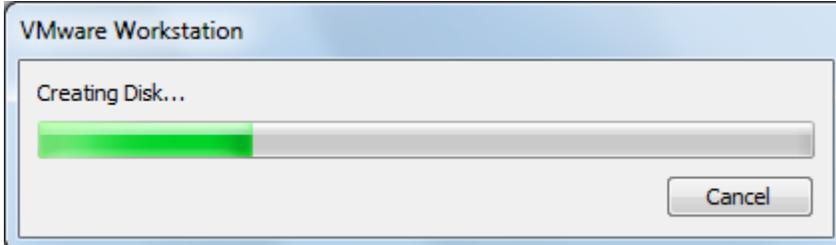
Allocate all of the disk space and do it as a single file. You don't want VMWare to ever have to create more space on the fly, for sound performance and uh-oh-I'm-out-of-space-on-the-host reasons. Storing as a single file is sensible and easy-to-manage, but your file system has to be able to support such a large file. If you are using FAT32 in Windows, Windows provides a conversion tool to convert to NTFS (and keep your existing data!). Check [TechNet](#) for details.

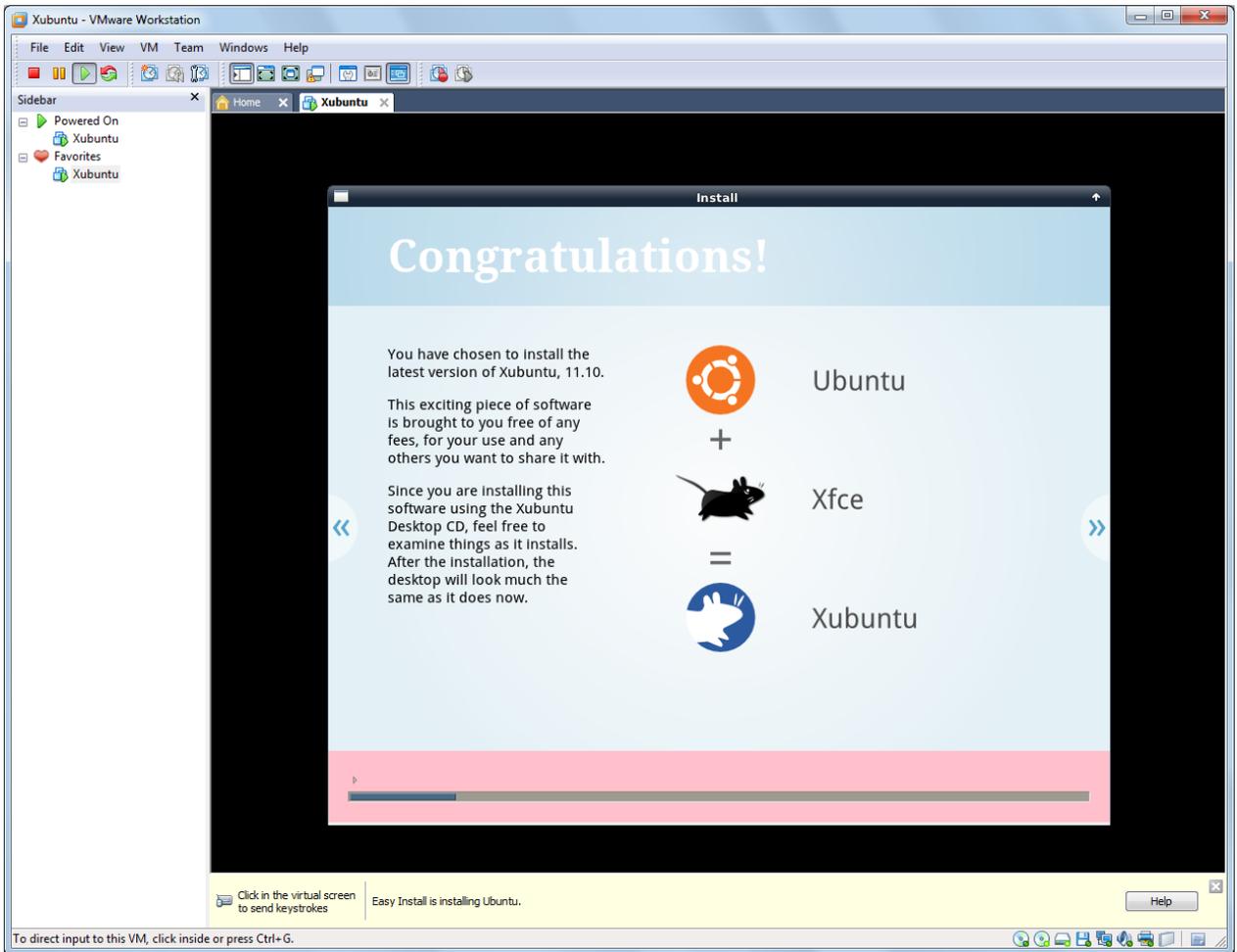


The default name for your disk file is based on the name of the VM you specified earlier. You can keep it the same, for simplicity's sake.

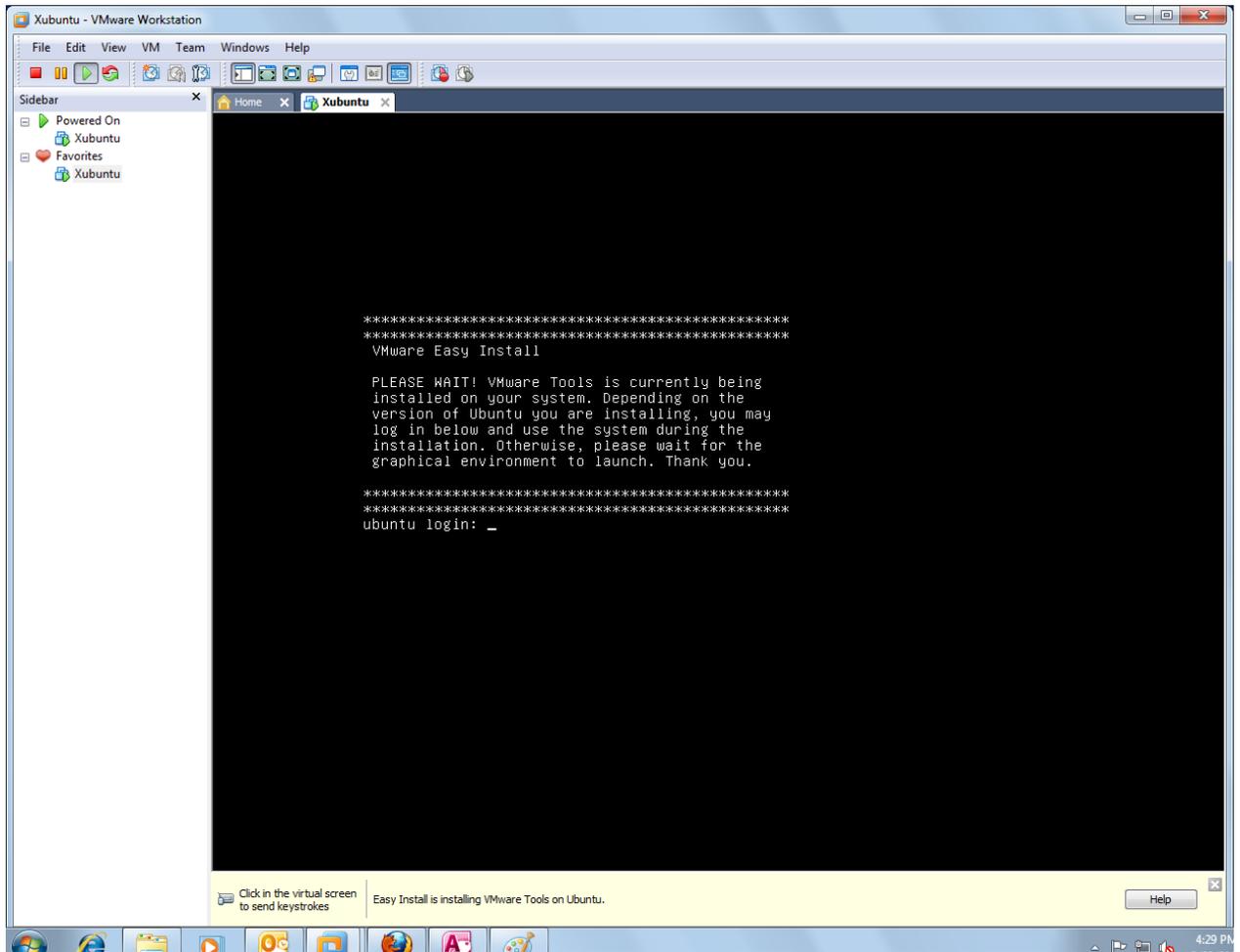


The above summary screen appears, and you can click “Finish” to begin creating the machine. You’ll see the disk being created (below) and then you will be taken into the Xubuntu installation (below that).

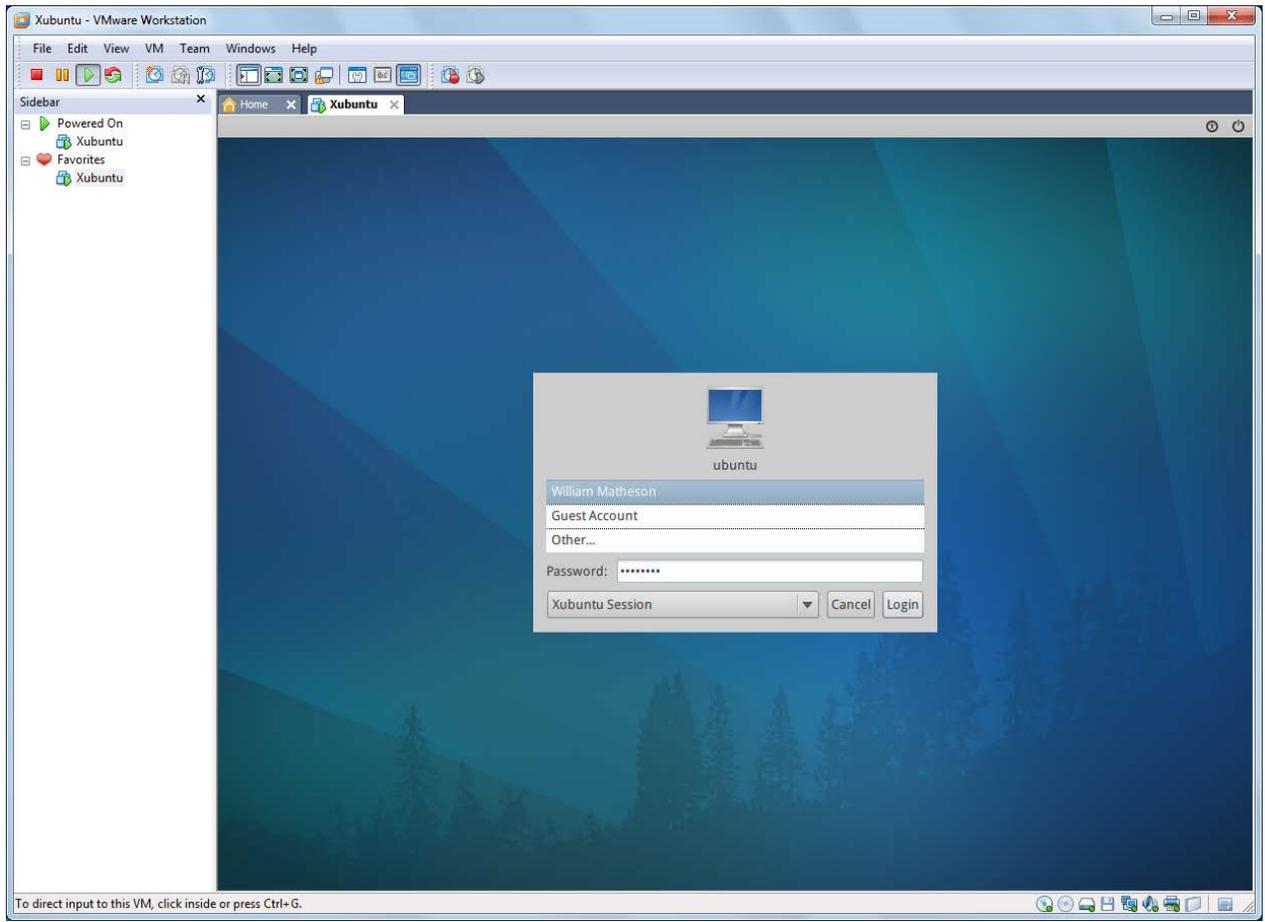




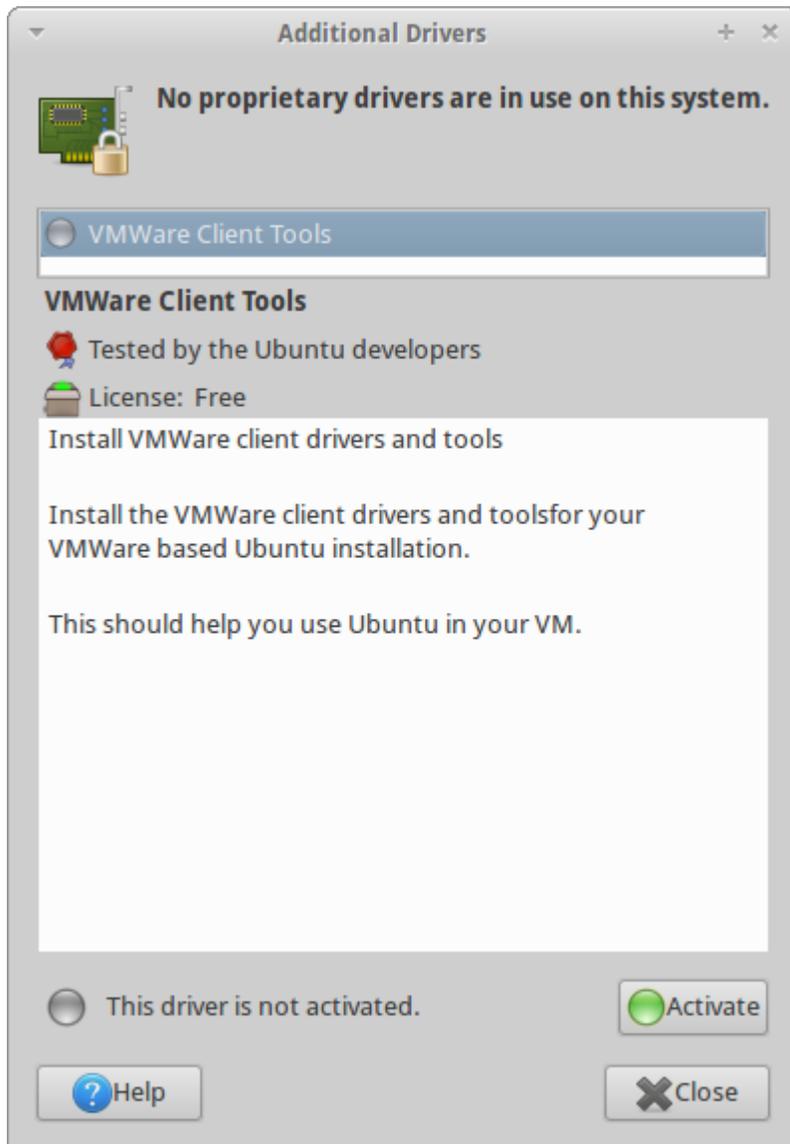
While the installation is running, you can press on the << and >> buttons to view various Xubuntu features, making an unpleasant discovery if you were conned into buying it on eBay.



After the main operating system is installed, VMware will force installation of VMware Tools. Despite the talk of graphical environments launching, in your Bedford author's experience, this never happens. When the disk light stops blinking and nothing happens for a very long time, reboot the VM (go to the VM menu in VMware tools to do this).



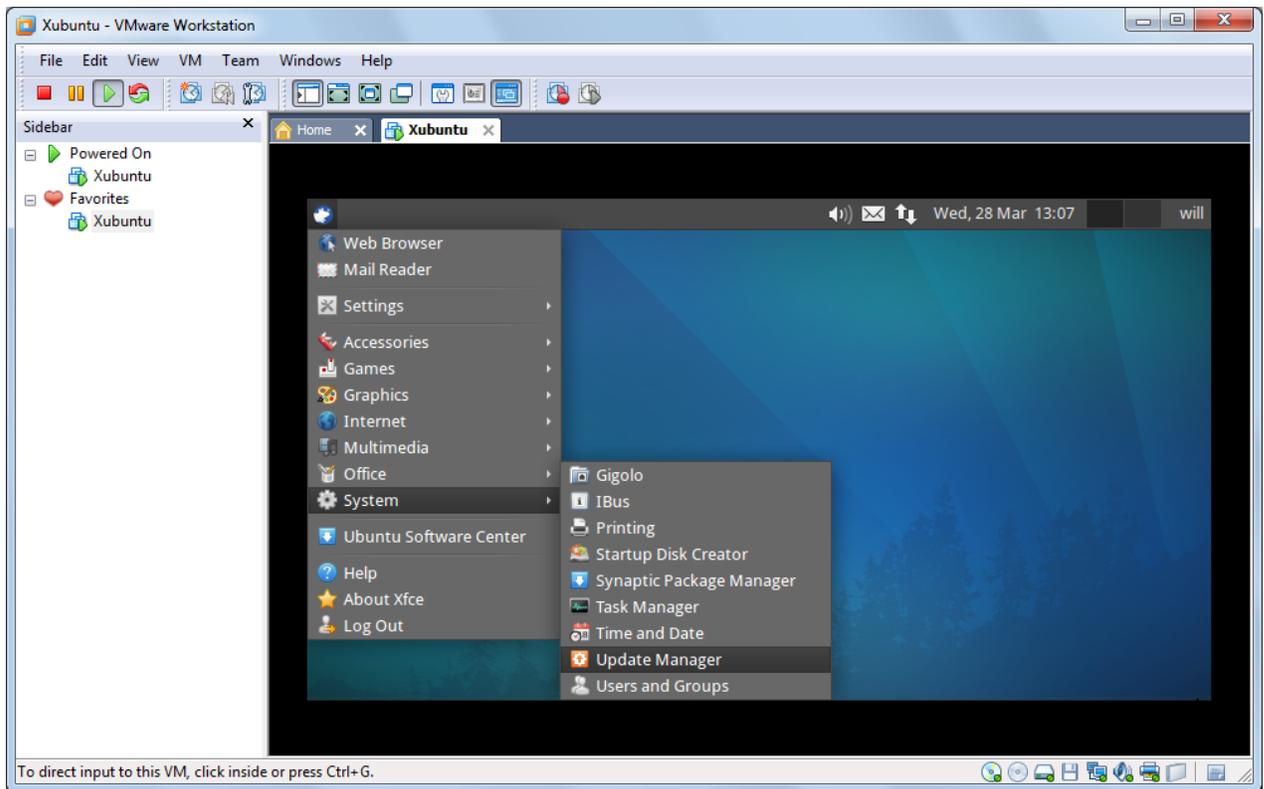
And here we are! Welcome to Xubuntu! Select your name and enter the password you entered with the VM creation wizard. You'll land safely on the Xubuntu desktop. And with luck, you'll notice an "Additional Drivers" notification pops up on the upper right...



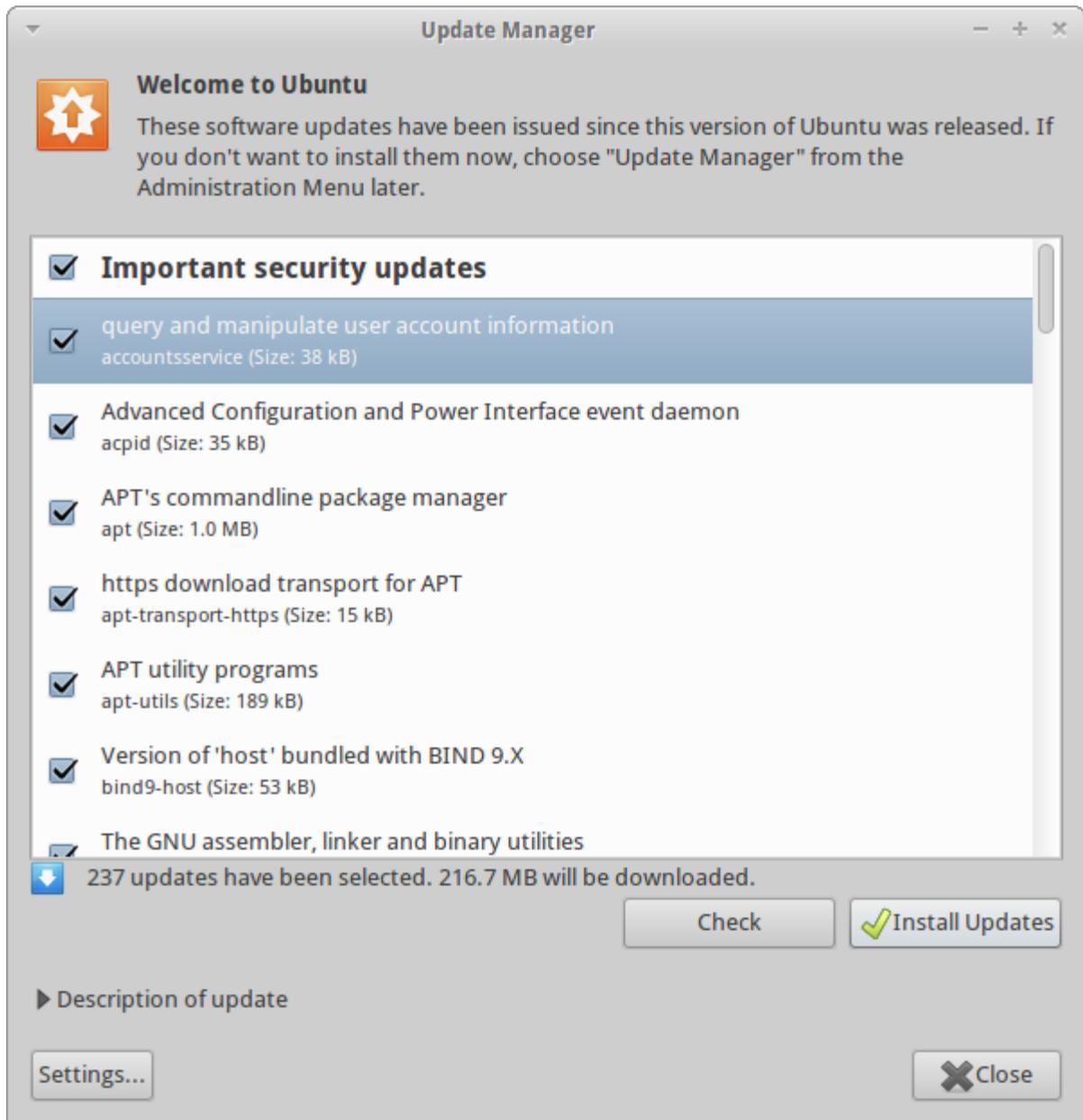
You can click into it and find that VMWare Tools is waiting to be activated. So activate it.



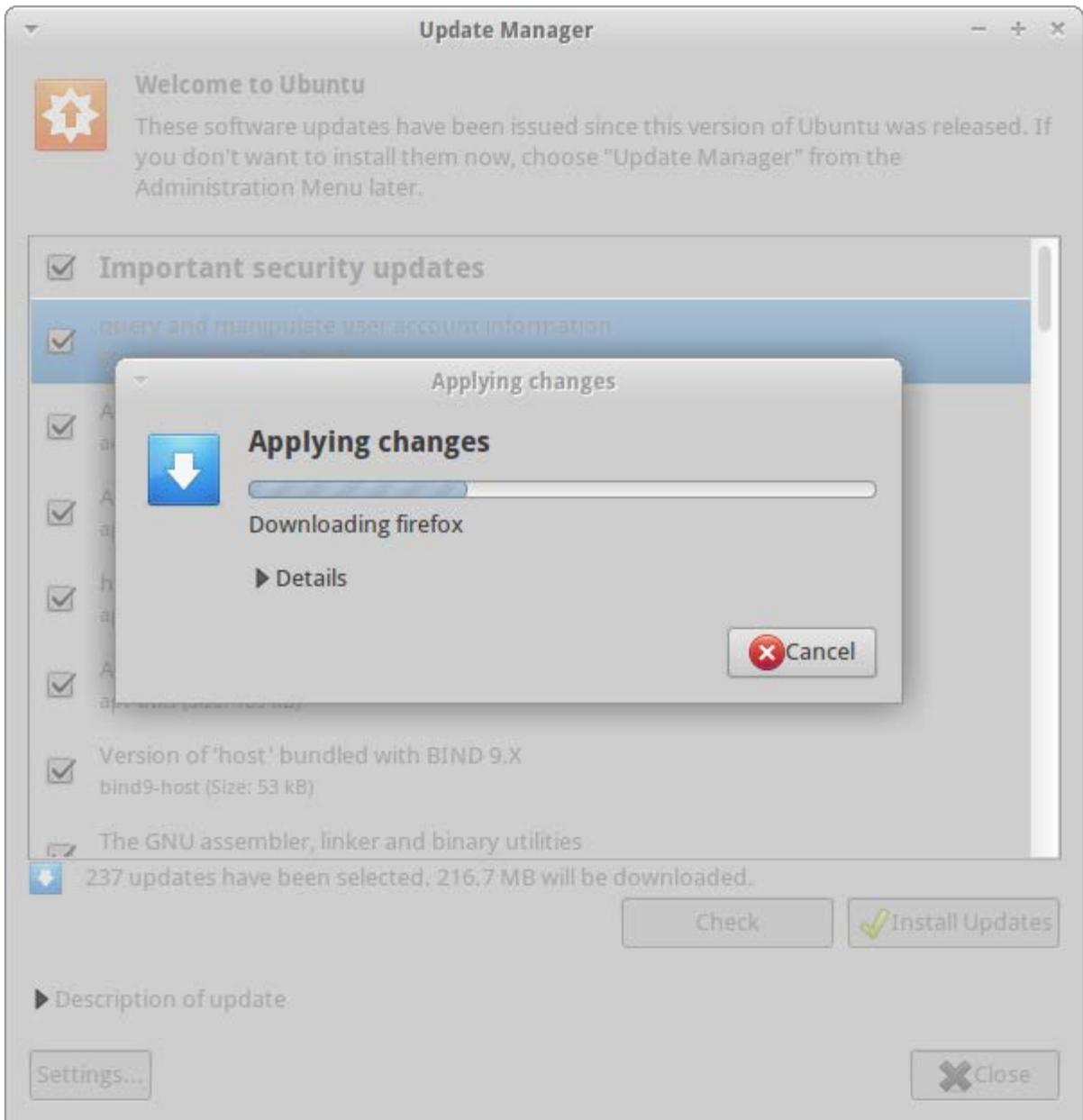
You will see this a *super* lot. Hopefully your password is easy to enter!



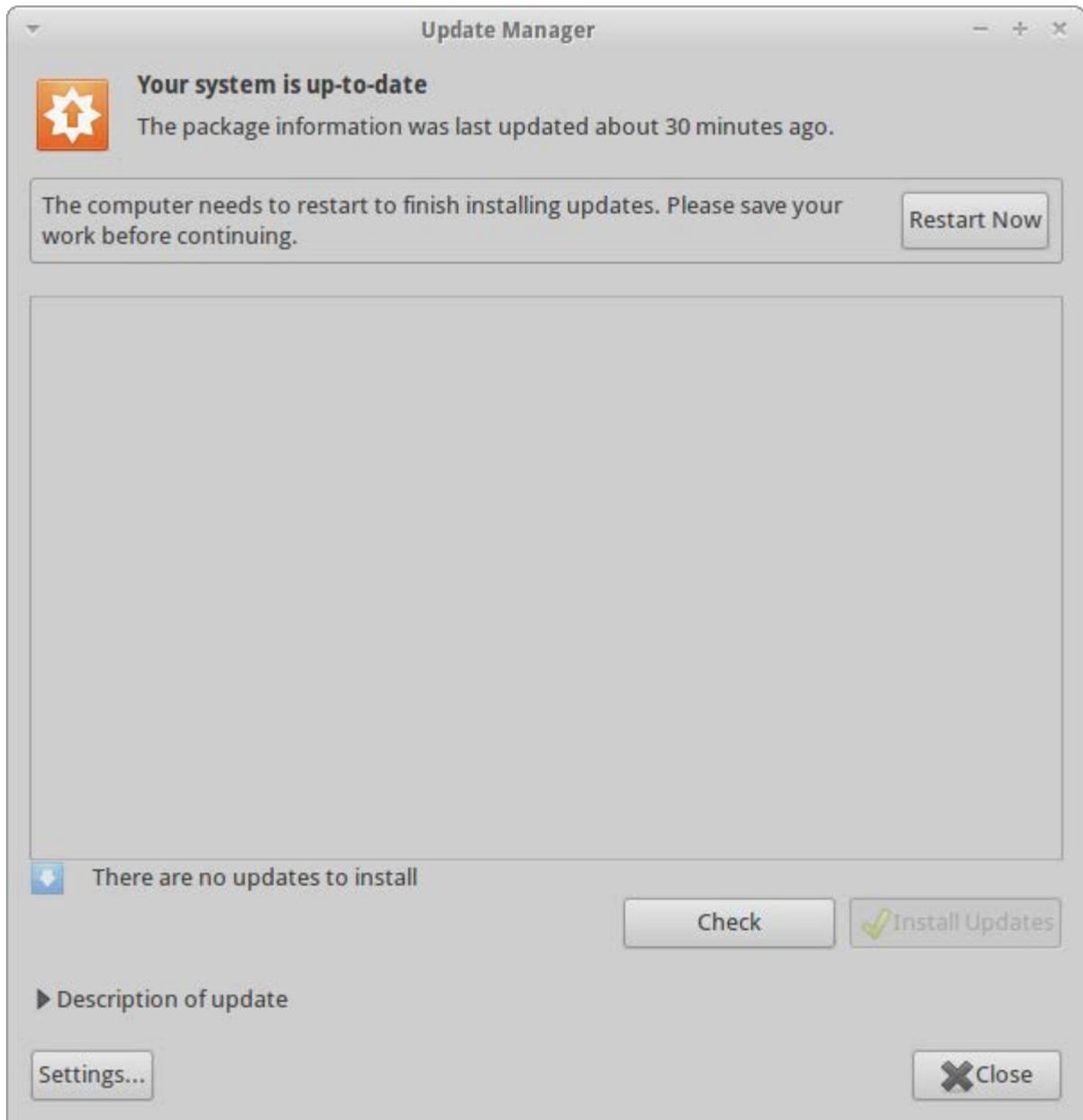
Now we want to get updates. In keeping with established open-source practices, there is a new version of the distribution every other Tuesday, but distributions like the Ubuntu family are known to release updates for existing distributions for as long as six or seven weeks. In the menu on the top left (let's call it the Squeak Menu), select "System" and "Update Manager".



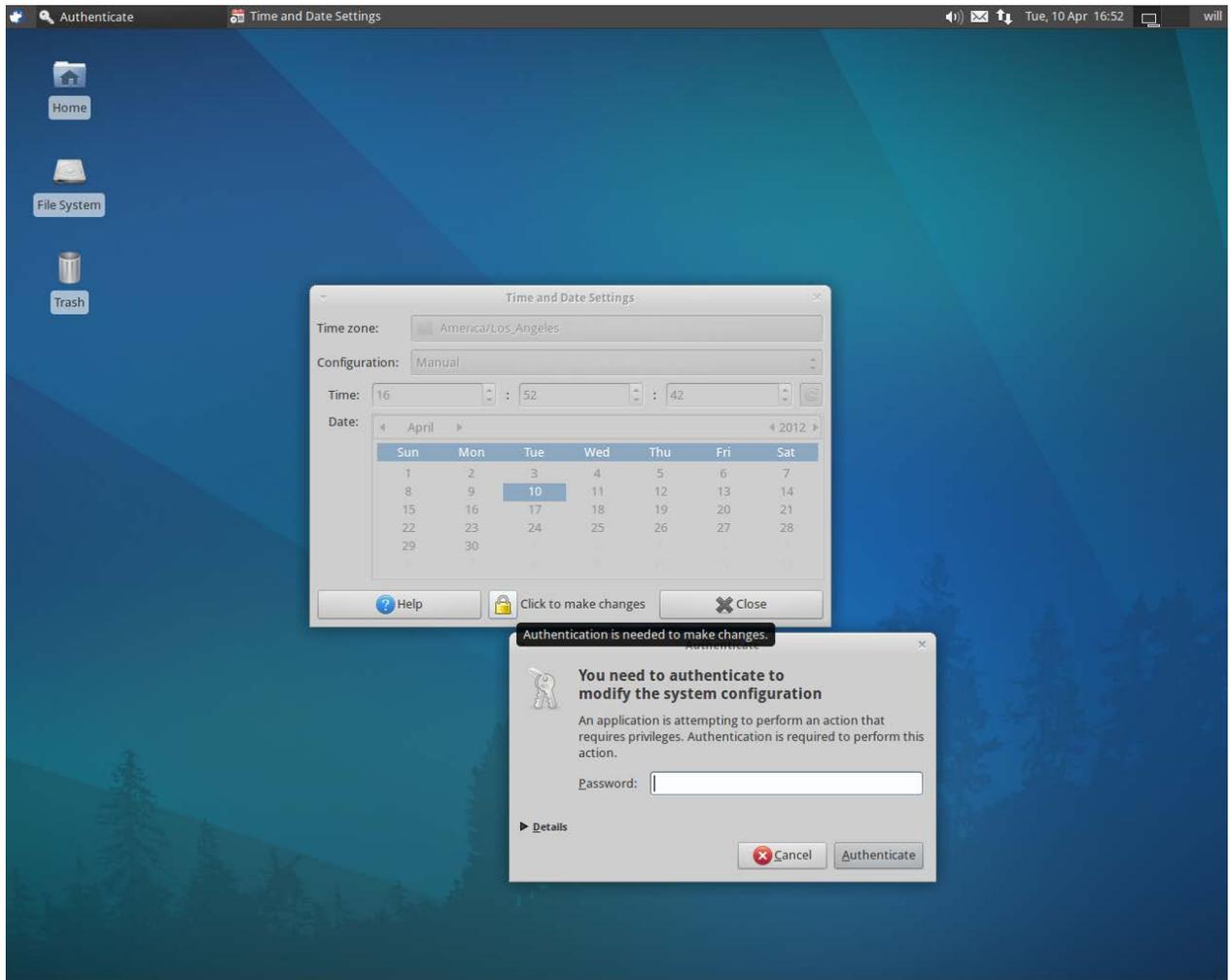
The time it takes to filter out the updates that you know you'll never use is probably less than the time to download and install all of the updates. If you're satisfied with the selections, click "Install Updates". You can click on "Settings..." to verify / change the automatic update settings, but automatic updates are the default.



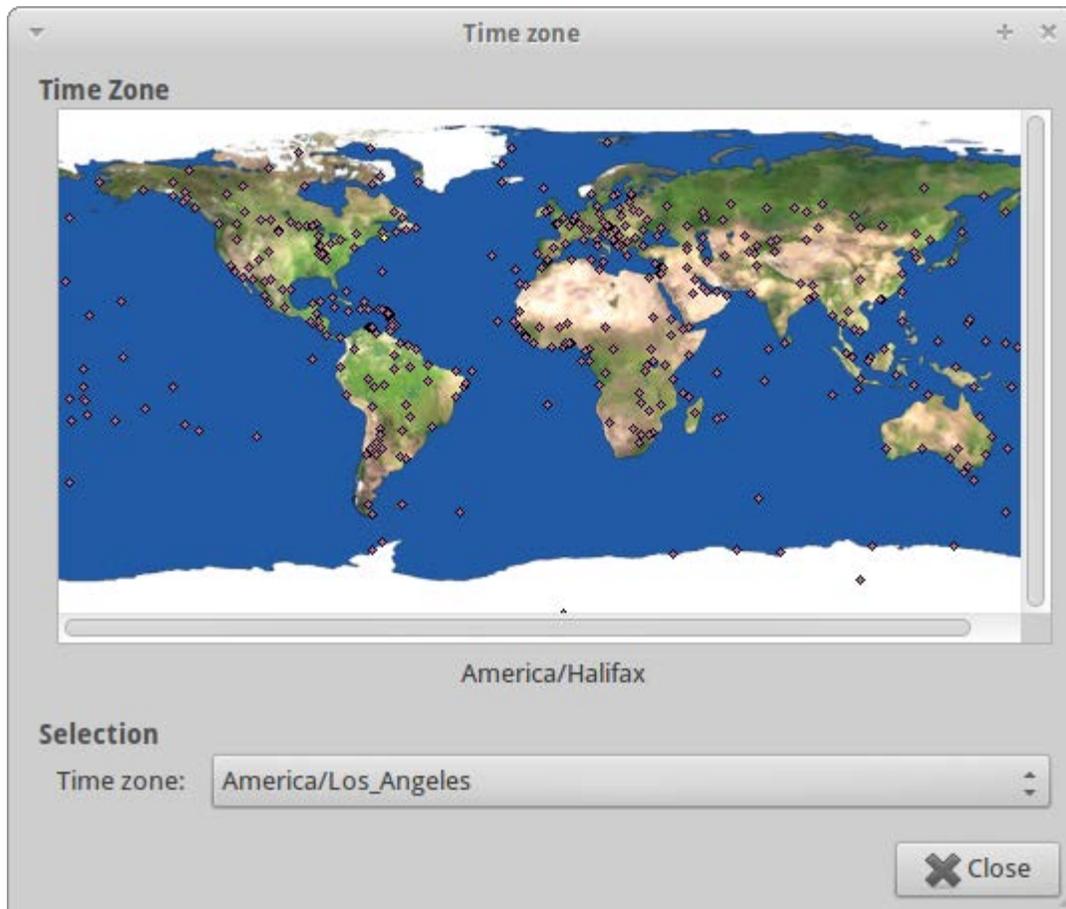
Xubuntu will then connect to a file-sharing service and download a mediocre Clint Eastwood movie.



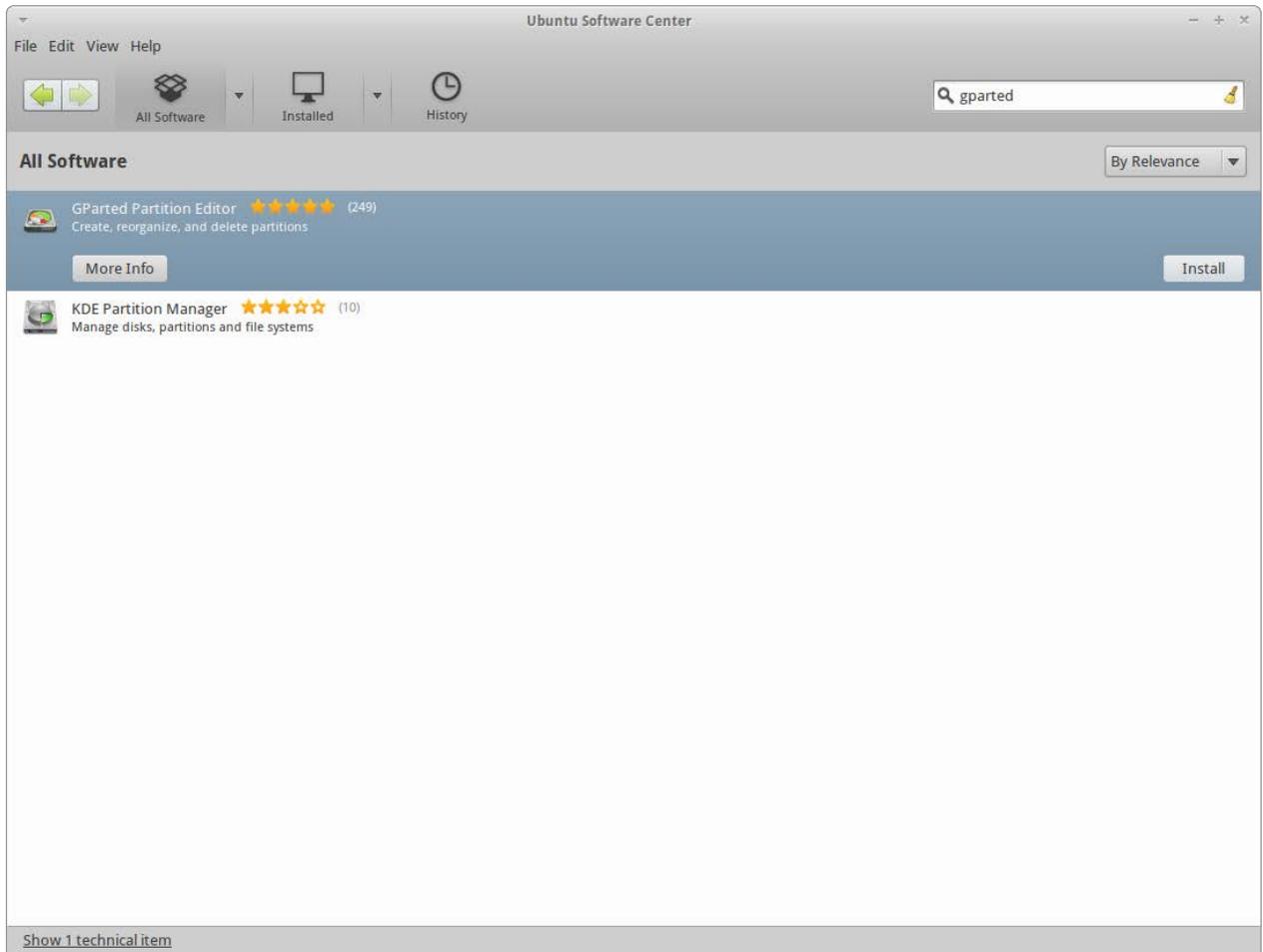
Restart the “computer” (your virtual machine, if you’re virtualizing) by pressing Restart Now. Don’t admit to any Windows users that you had to do so, however.



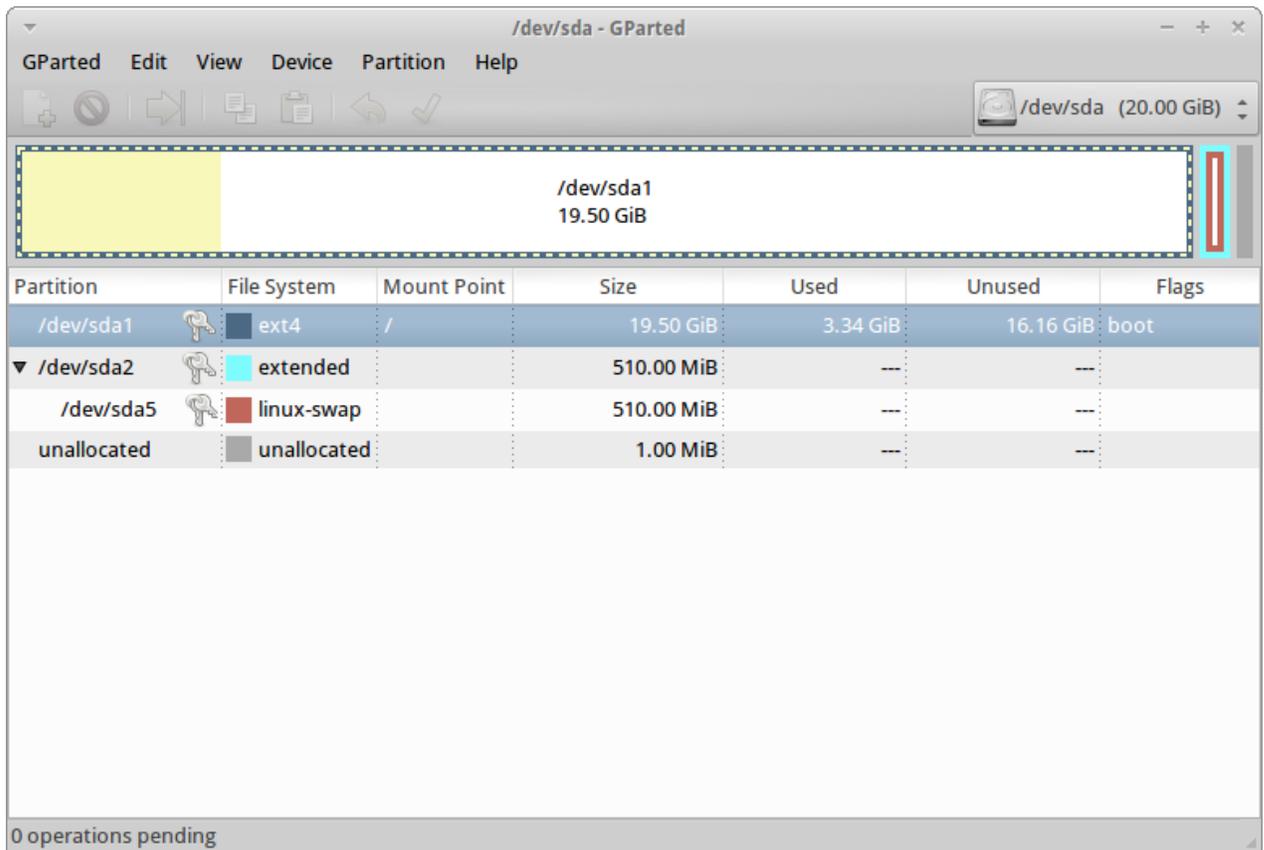
Now that the dust has settled (for the moment), you can take the time to personalize your installation. Among other things, you'll want to ensure the clock is set correctly. Xubuntu will probably be aware of the UTC time (assuming your host OS clock was set(up) correctly), but it might have your time zone wrong. Under the Squeak Menu at the upper left, select "System", then "Time and Date". Unlock the padlock as shown above.



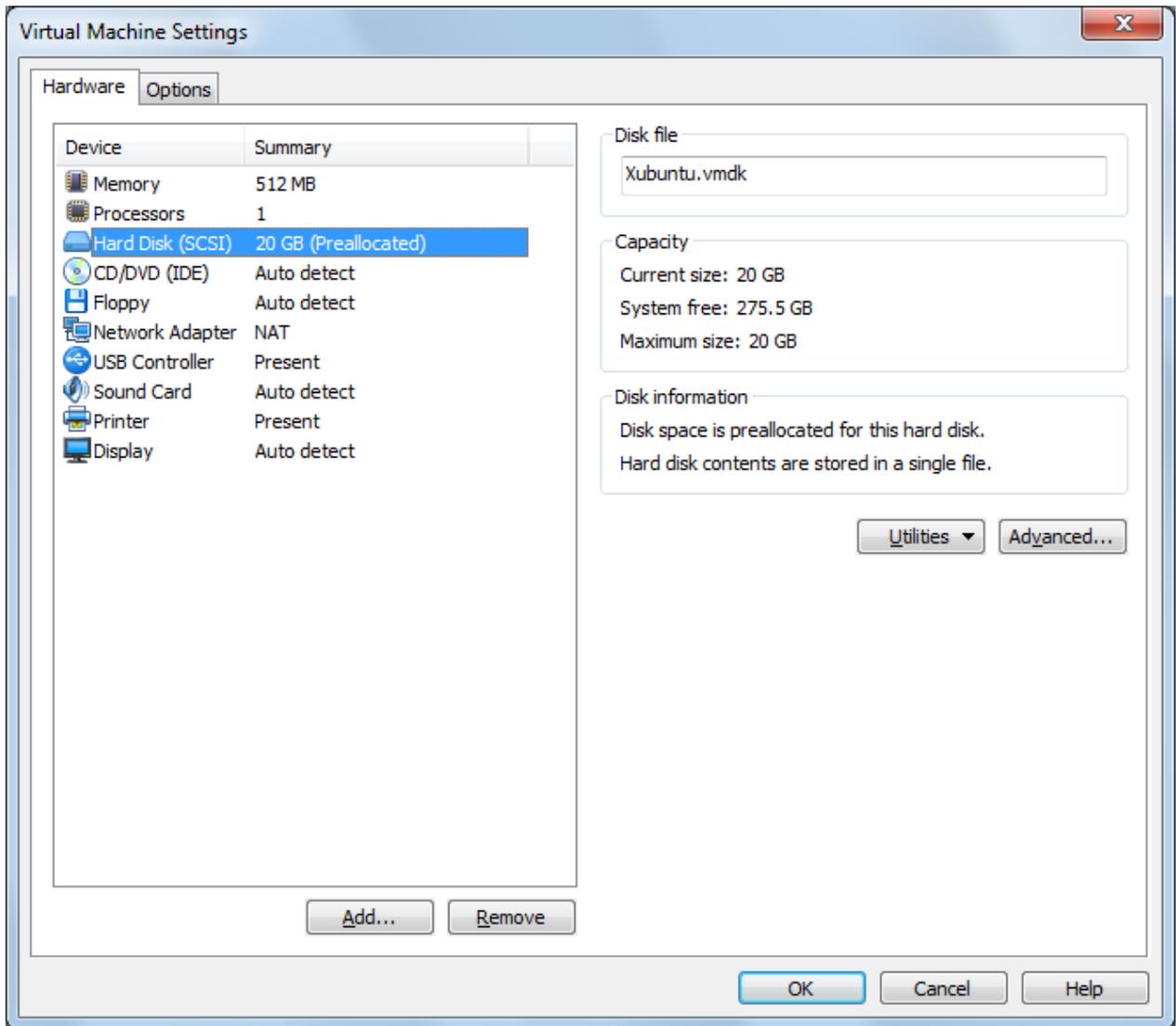
Now you can select your time zone. Note that there are many more than 24 – these account for variations in daylight savings time policies and other such things. Back on the originating screen, you can relock the padlock to lock down the time again if you wish.



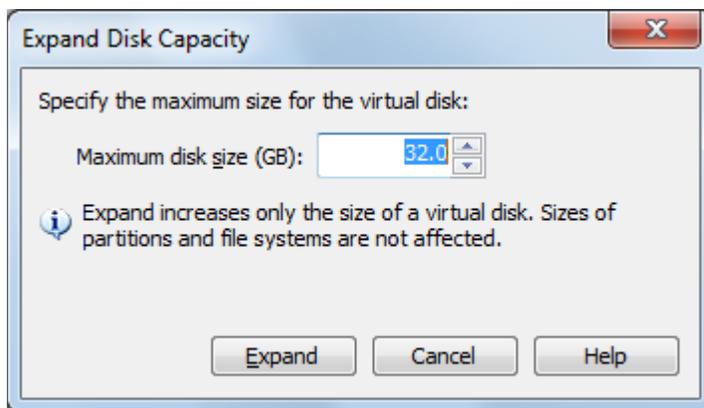
Finally, you might find yourself in a position where your project supervisor is fussy about the partitioning of the (virtual) disk. To take a look at the lay of the land, let's install GParted. First, under the Squeak Menu, go to "Ubuntu Software Center". Search for "gparted" as shown above, and install it by pressing the "Install" button that appears when you click on the program name. When the installation is complete, GParted will be available under "System" in the Squeak Menu.



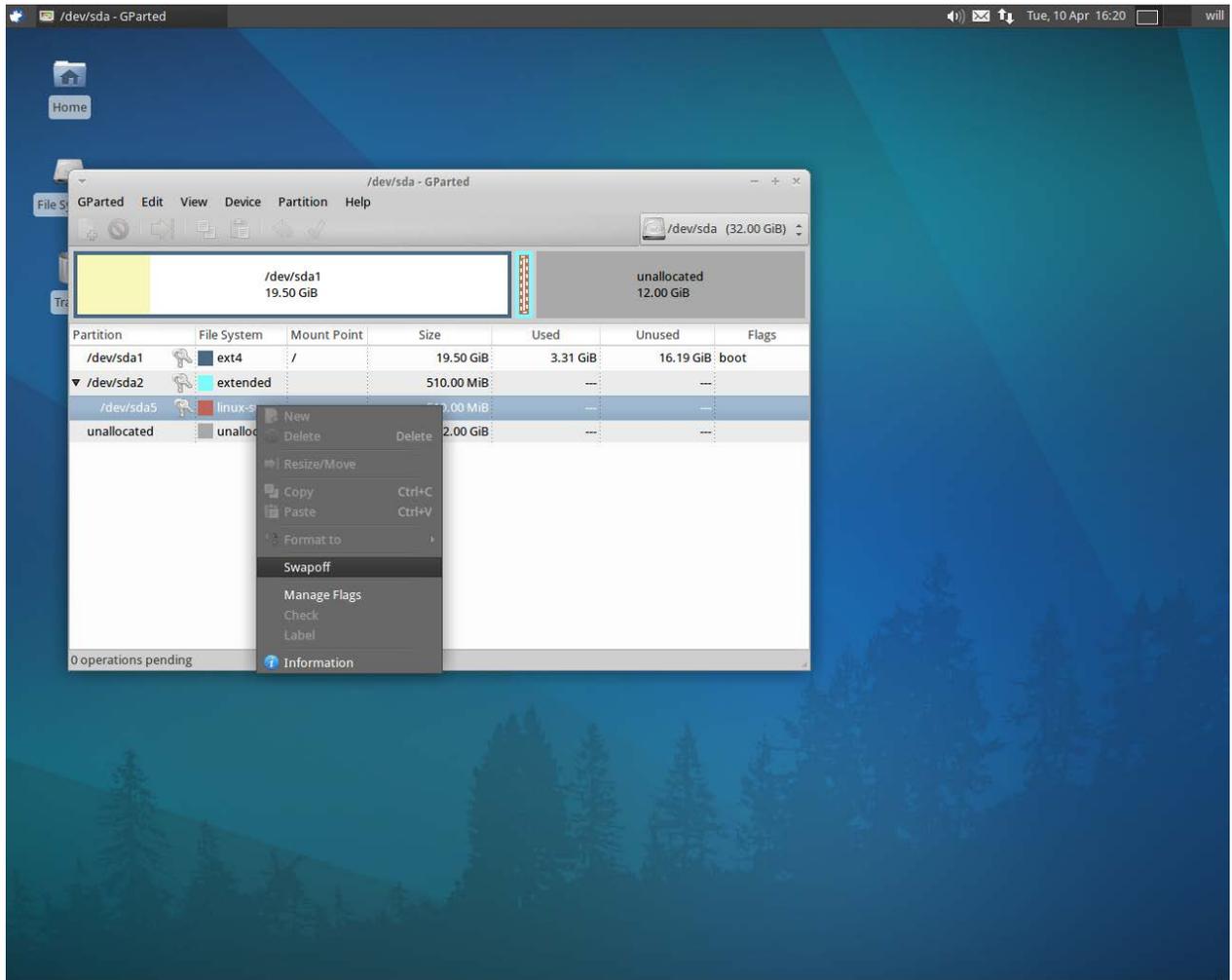
Your Bedford author needed to implement a 2.5 GB swap and a 10 GB “data” partition. Although Stacker or DoubleSpace would make a heroic effort of getting that extra 12 GB into the 1 MB of unallocated space, the thing to do here is to expand the disk from 20 GB to 32 GB. If this is a physical machine, you’ll want to visit an electronics store. For virtual disks, we’re going to shut down the VM and then change the extent of the virtual disk file.



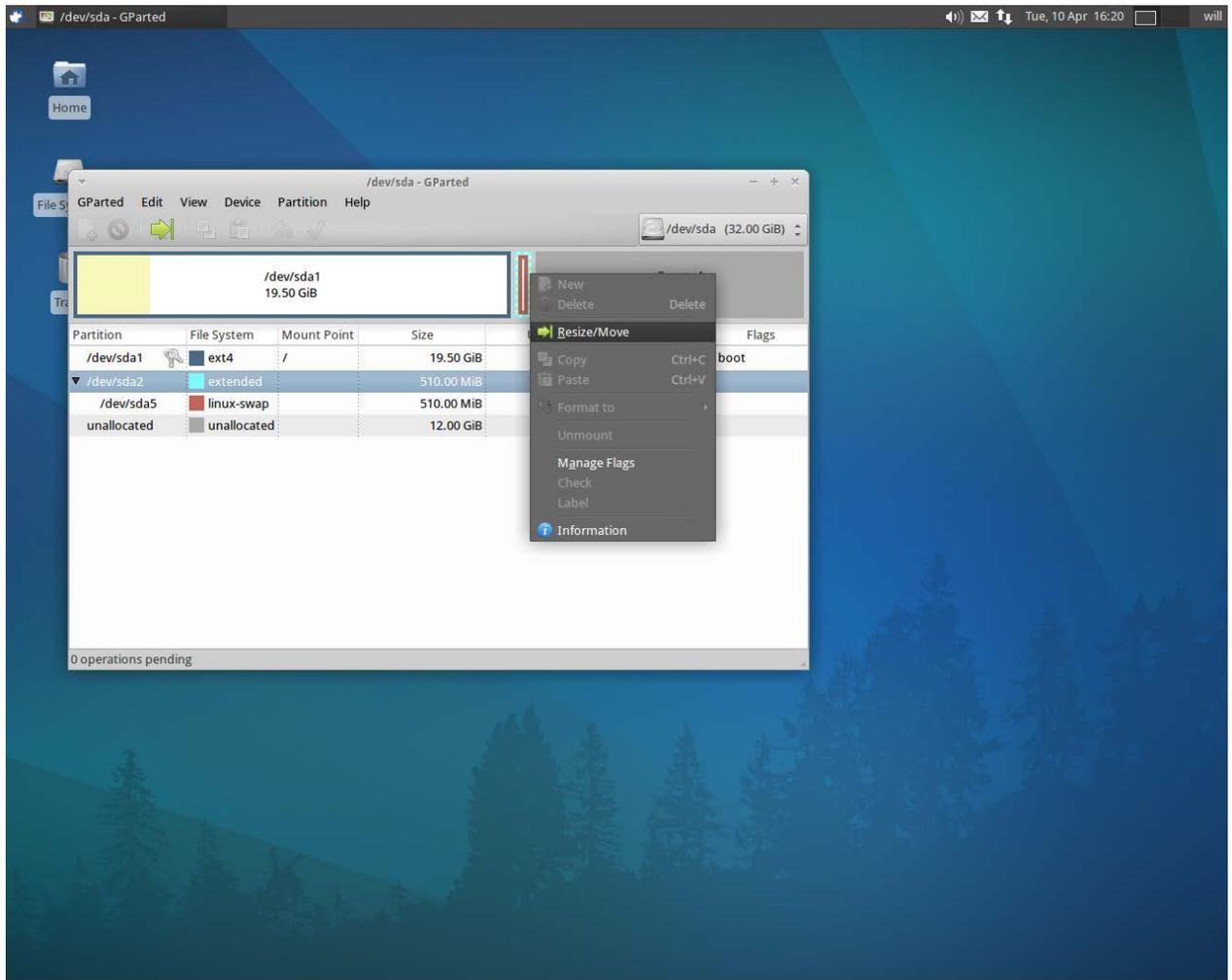
With your VM open (but not powered on), select “Edit Virtual Machine Settings” The above menu appears. Select the “Hard Disk” (left) and click on the “Utilities” button (right). Select “Expand...”, then increase the maximum size. Click “Expand” when you’re ready.



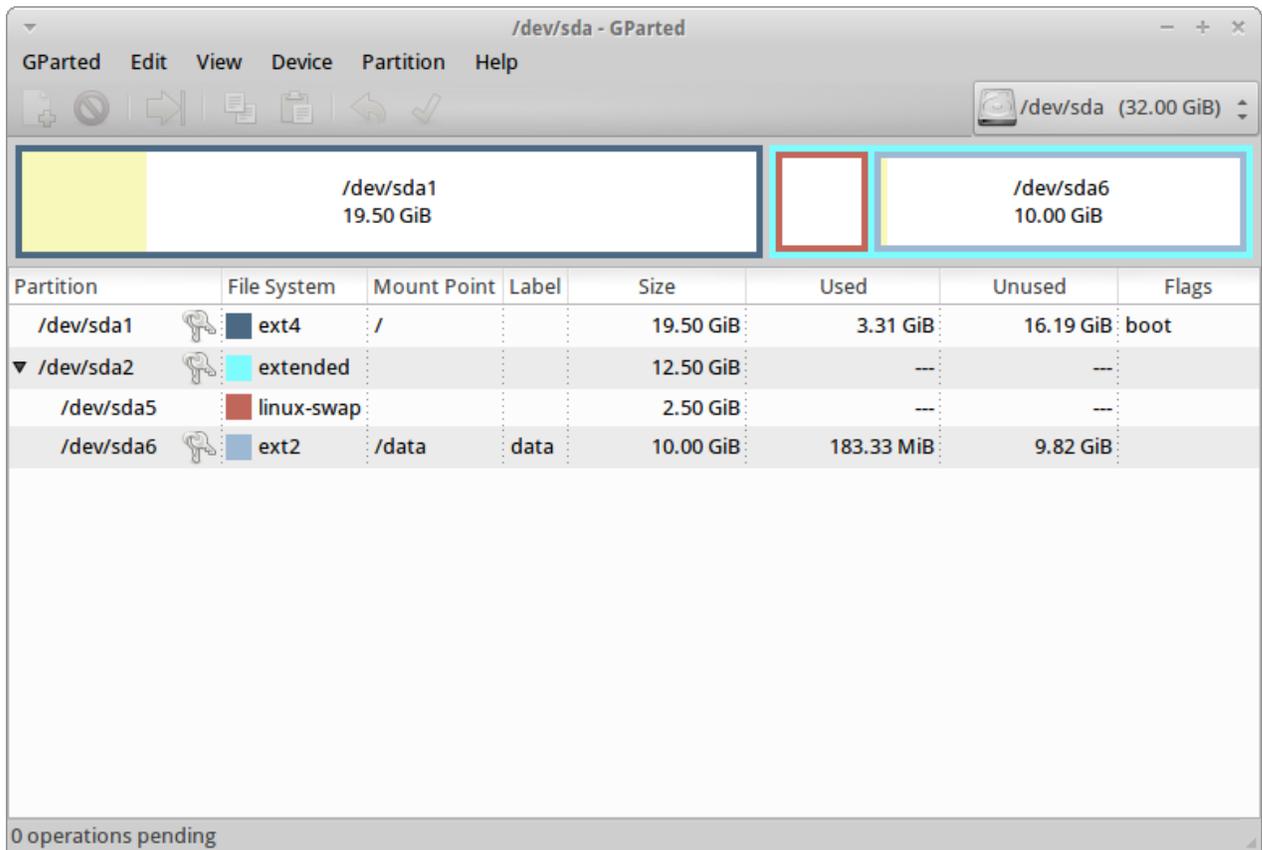
When the expansion is complete, VMWare will again remind you that you need to go back into the VM if you want to change its partitions (but they will now have more disk space to expand into). So let's restart Xubuntu and get back into GParted.



First, we have to turn the swap off if we want to do anything with it or anything else in the extended partition. We can accomplish this with a right click.



Now we click on the extended partition (the *outside* blue box) and make it bigger. In fact, we might as well have it take up the rest of the unallocated space and just make the /data partition a logical partition inside the extended partition too. Then we can resize the swap as we like (to 2.5 GB, for instance), and right click in the unallocated space inside the extended partition and put in a new one. We'll call it data and let it use the ext2 file system (default).



When we're finished making changes, we can click on the green checkmark to commit them. If you're following along with us, you should have the layout shown above when the dust settles, except for one tricky thing: mounting the new "data" partition. We'll take this on manually.

This part is based on instructions in a document called "Mounting Linux Partitions in Ubuntu", available at, erm, [psychocats.net](http://psychocats.net). We'll bear in mind that we want to mount at /data and that our new partition /dev/sda6 uses ext2.

So, following Figure A on the following page, let's open a terminal window (Squeak > Accessories > Terminal Emulator) and create "/data". Enter "sudo mkdir /data" (not "/storage" – your Bedford author may have been undercaffeinated). Now we want to determine the unique identifier of the new partition. Enter `ls -l /dev/disk/by-uuid` and grab the long alphanumeric nightmare associated with the new partition (for us, it's the 665ff... associated with "sda6"). If you want to copy-and-paste that, highlight it with your mouse and right-click or use Edit > Copy in the terminal window controls (and the same rules apply for Pasting). Now we're going to edit /etc/fstab, so enter "sudo cp /etc/fstab /etc/fstab\_backup" (if you want to make a backup) and then "sudo nano /etc/fstab" to fire up an editor.

Following Figure B, enter the new line (you can just start typing) "UUID=665ffBlahblahblah /data ext2 defaults 0 0", then save and exit (Ctrl + X followed by Y). Referring back to Figure A, enter "sudo mount -a" to make Xubuntu notice our changes. If you forgot to make the mount point directory, make it, then try again.

Figure A

```
Terminal - will@ubuntu: ~
File Edit View Terminal Go Help
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0000c0f9

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1  *          2048     40894463    20446208   83   Linux
/dev/sda2                40896510     67108863    13106177    5   Extended
/dev/sda5                40896512     46129151     2616320   82   Linux swap / Solaris
/dev/sda6                46131200     67108863    10488832   83   Linux
will@ubuntu:~$ sudo mkdir /storage
will@ubuntu:~$ ls -l /dev/disk/by-uuid
total 0
lrwxrwxrwx 1 root root 10 2012-04-10 16:33 665ff2f6-23db-4a4c-a6fc-54d477cae00b
-> ../../sda6
lrwxrwxrwx 1 root root 10 2012-04-10 16:28 a9b76842-9d57-4a75-a330-c3ee6b77fb28
-> ../../sda1
lrwxrwxrwx 1 root root 10 2012-04-10 16:33 bb22e3d2-bf66-401c-b43f-fecf96015577
-> ../../sda5
will@ubuntu:~$ sudo cp /etc/fstab /etc/fstab_backup
will@ubuntu:~$ sudo nano /etc/fstab
will@ubuntu:~$ sudo mount -a
mount: mount point /data does not exist
will@ubuntu:~$ sudo mkdir /data
will@ubuntu:~$ sudo mount -a
will@ubuntu:~$
```

Figure B

```
Terminal - will@ubuntu: ~
File Edit View Terminal Go Help
GNU nano 2.2.6 File: /etc/fstab Modified

# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# <file system> <mount point> <type> <options> <dump> <pass>
proc /proc proc nodev,noexec,nosuid 0 0
# / was on /dev/sda1 during installation
UUID=a9b76842-9d57-4a75-a330-c3ee6b77fb28 / ext4 errors=remoun$
# swap was on /dev/sda5 during installation
UUID=bb22e3d2-bf66-401c-b43f-fecf96015577 none swap sw $
/dev/fd0 /media/floppy0 auto rw,user,noauto,exec,utf8 0 0
UUID=665ff2f6-23db-4a4c-a6fc-54d477cae00b /data ext2 defaults 0 0

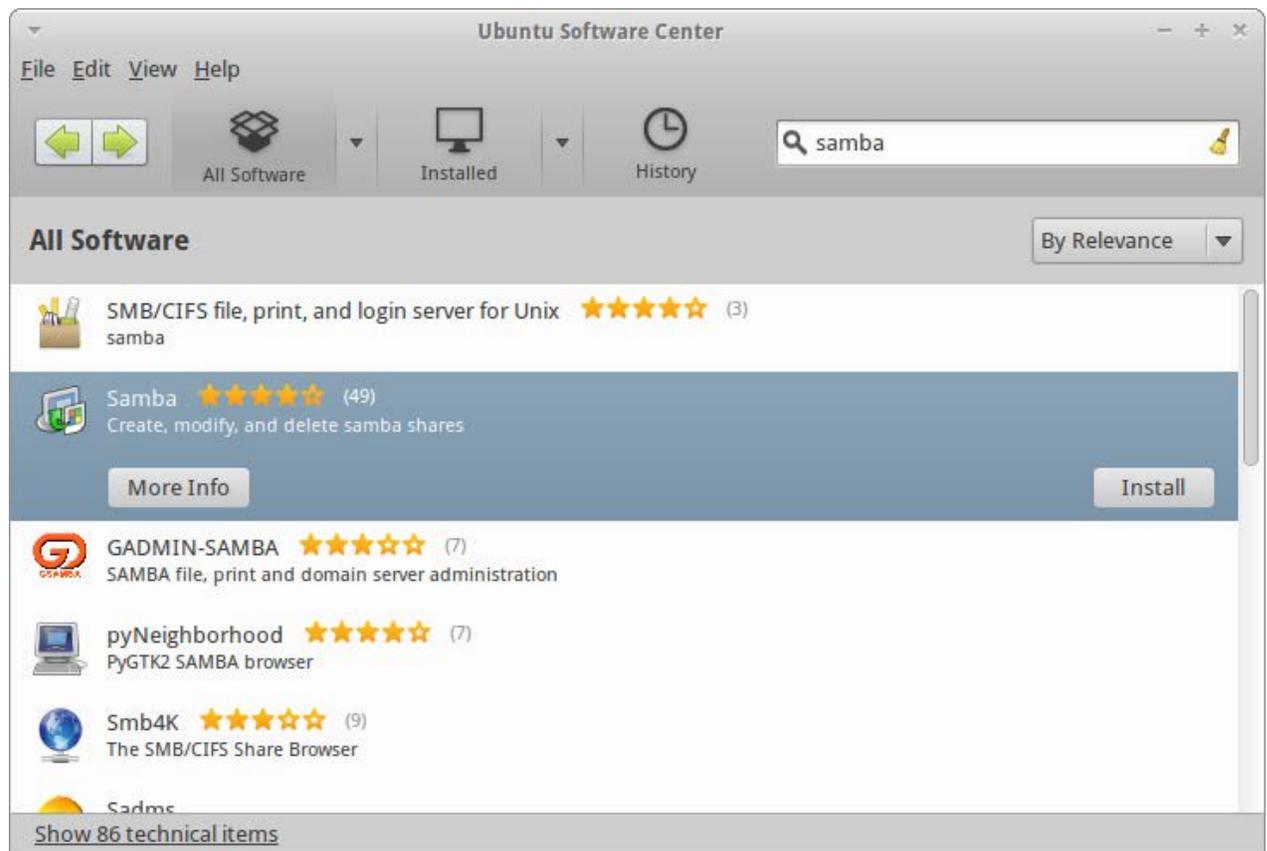
^G Get Help ^O WriteOut ^R Read File ^Y Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^V Next Page ^U UnCut Text ^T To Spell
```

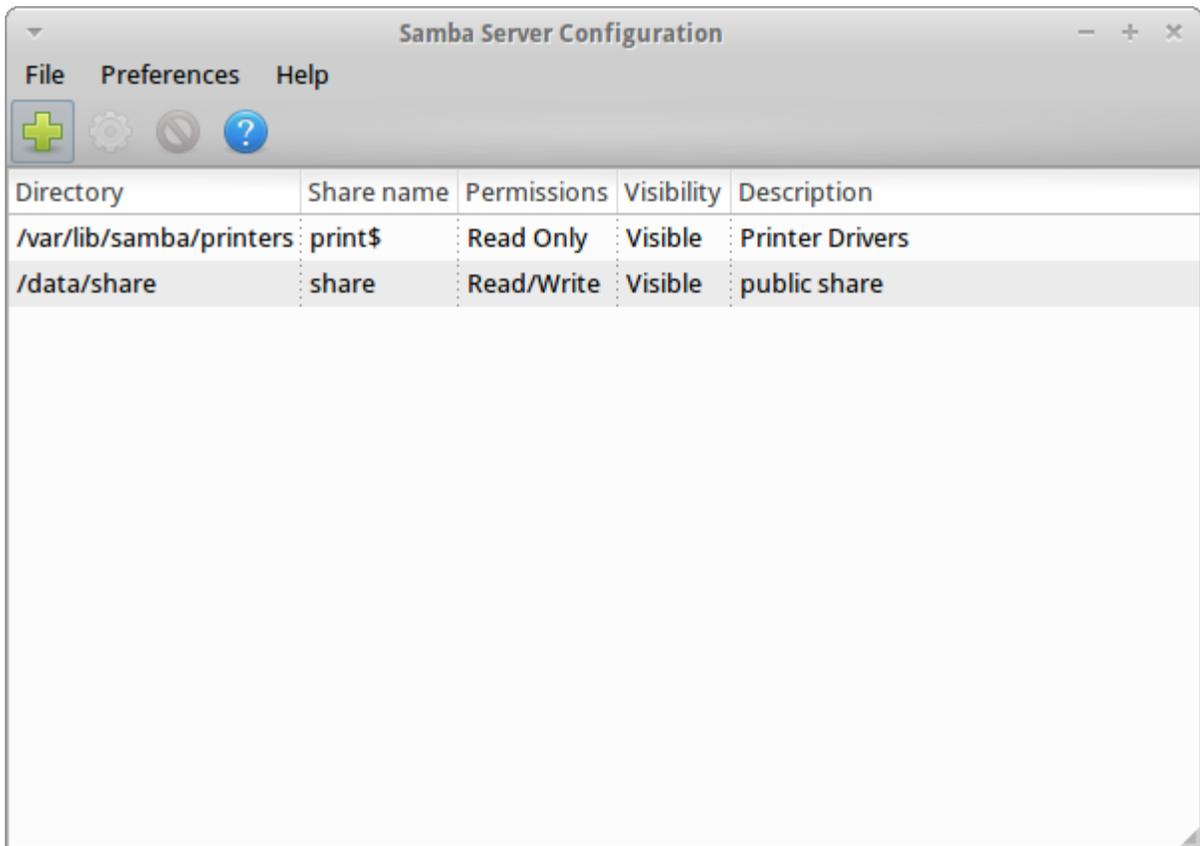
Now we're ready to get our Xubuntu to deliver useful services.

## Samba

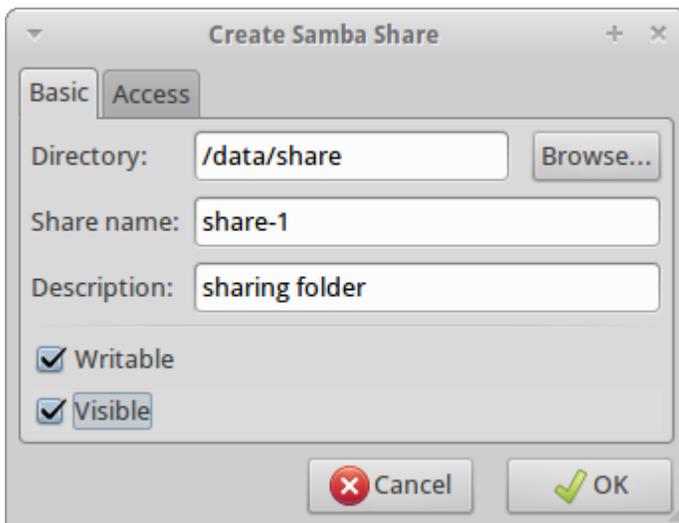
As stated on the project [website](#), Samba is the standard Windows-interopability suite of programs for Linux and Unix. With Samba, a Unix host can participate fully in a Windows networking environment, using file and print sharing services as well as being compatible with Active Directory network management.

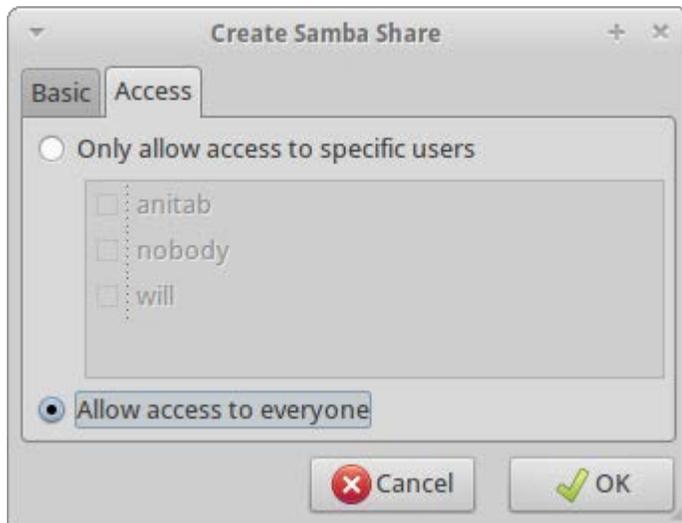
Samba isn't included with Xubuntu at installation, but it is easy to get rolling. Go to Squeak > Ubuntu Software Center and search for "samba". Install "Samba".





After installation, a “Samba” listing appears under Squeak > System. Click on it to be taken to a configuration tool, and press the green + to make a new share, then browse for the folder you want to share and assign permissions as desired.





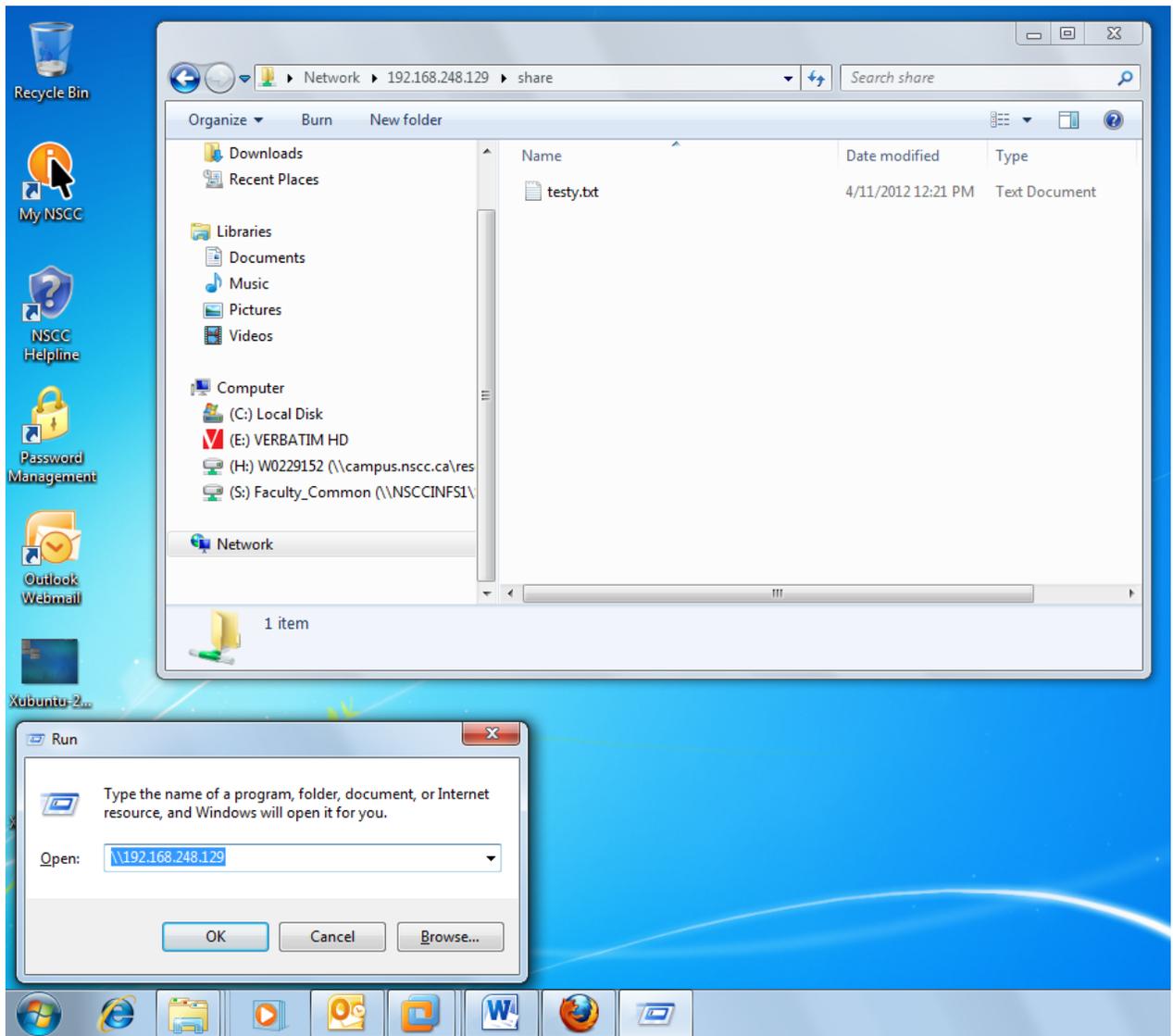
Under the access tab, decide the scope of access. If you limit it to specific users, they'll have to provide the appropriate credentials to the client operating system before they can access the share.

To access the share, you'll need the IP address of the Xubuntu machine. Open a terminal window and run "ifconfig". The IP address for our example Xubuntu session is highlighted below. This could be subject to change – check with your local networking guru.

```
Terminal - will@ubuntu: ~
File Edit View Terminal Go Help
will@ubuntu:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0c:29:63:f9:dc
          inet addr:192.168.248.129  Bcast:192.168.248.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe63:f9dc/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:7589 errors:0 dropped:0 overruns:0 frame:0
          TX packets:3437 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:11188909 (11.1 MB)  TX bytes:228533 (228.5 KB)
          Interrupt:19 Base address:0x2024

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:27 errors:0 dropped:0 overruns:0 frame:0
          TX packets:27 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:3405 (3.4 KB)  TX bytes:3405 (3.4 KB)

will@ubuntu:~$ █
```



With the IP, users can locate your share, as shown here in Windows 7.

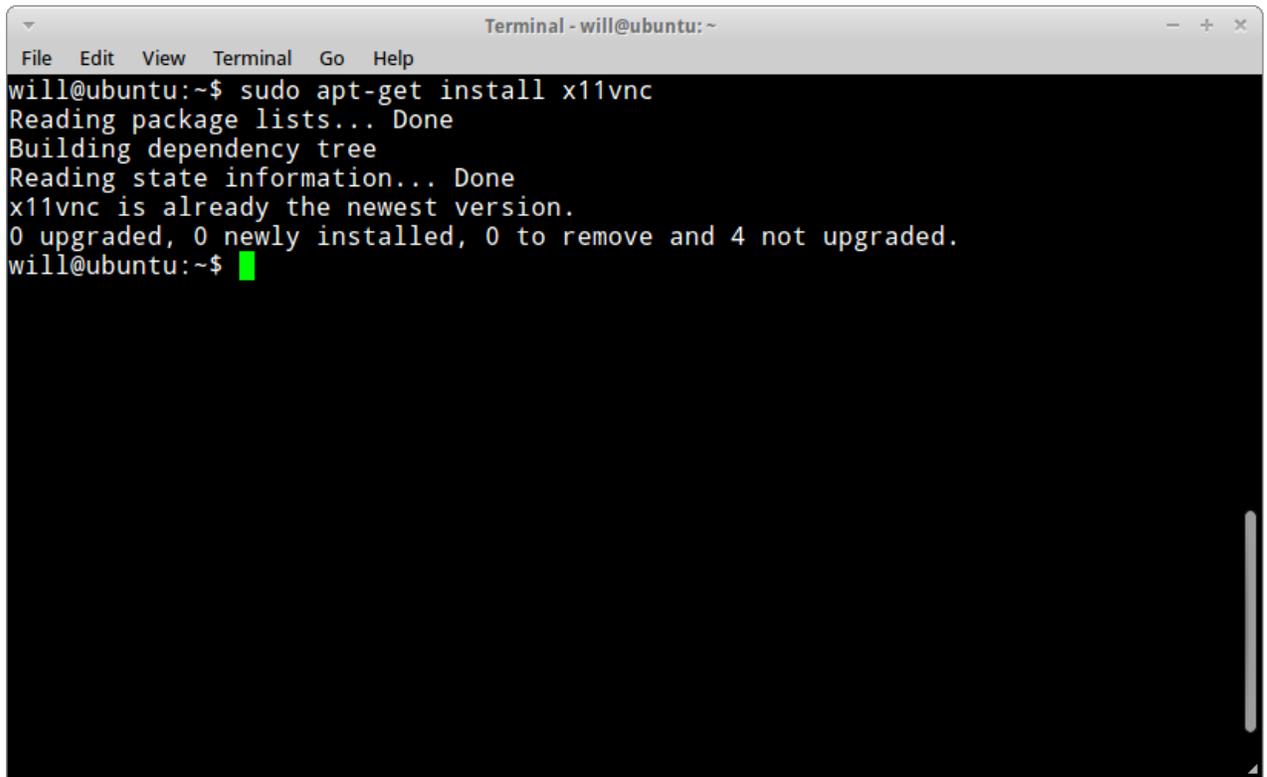
The Samba service is configured to start automatically by default.

For our next trick, we'll set up an VNC server in Xubuntu.

### Virtual Network Computing (VNC)

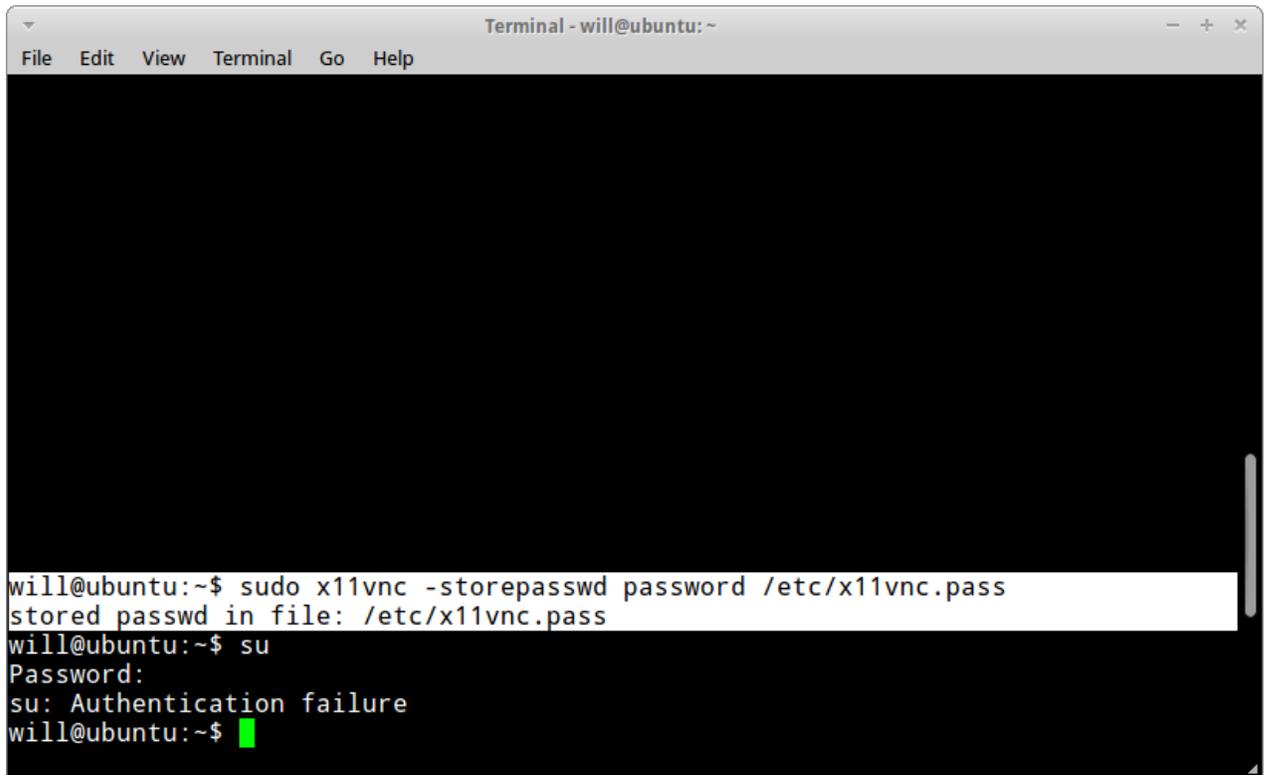
Virtual Network Computing is desktop sharing that uses a simple remote framebuffer (RFB protocol) to allow the remote control of the computer. If you have the IP address of the VNC "server", you can sign in from any internet-connected computer.

These instructions are based on the post "Xubuntu 11.10 vnc server" at [Chris's Technology Blog](#).

A terminal window titled "Terminal - will@ubuntu: ~" with a menu bar containing "File", "Edit", "View", "Terminal", "Go", and "Help". The terminal output shows the command "sudo apt-get install x11vnc" being executed. The output indicates that the package lists are read, the dependency tree is built, and state information is read. It then states that x11vnc is already the newest version and that 0 packages were upgraded, 0 newly installed, 0 to be removed, and 4 not upgraded. The prompt "will@ubuntu:~\$" is shown with a green cursor.

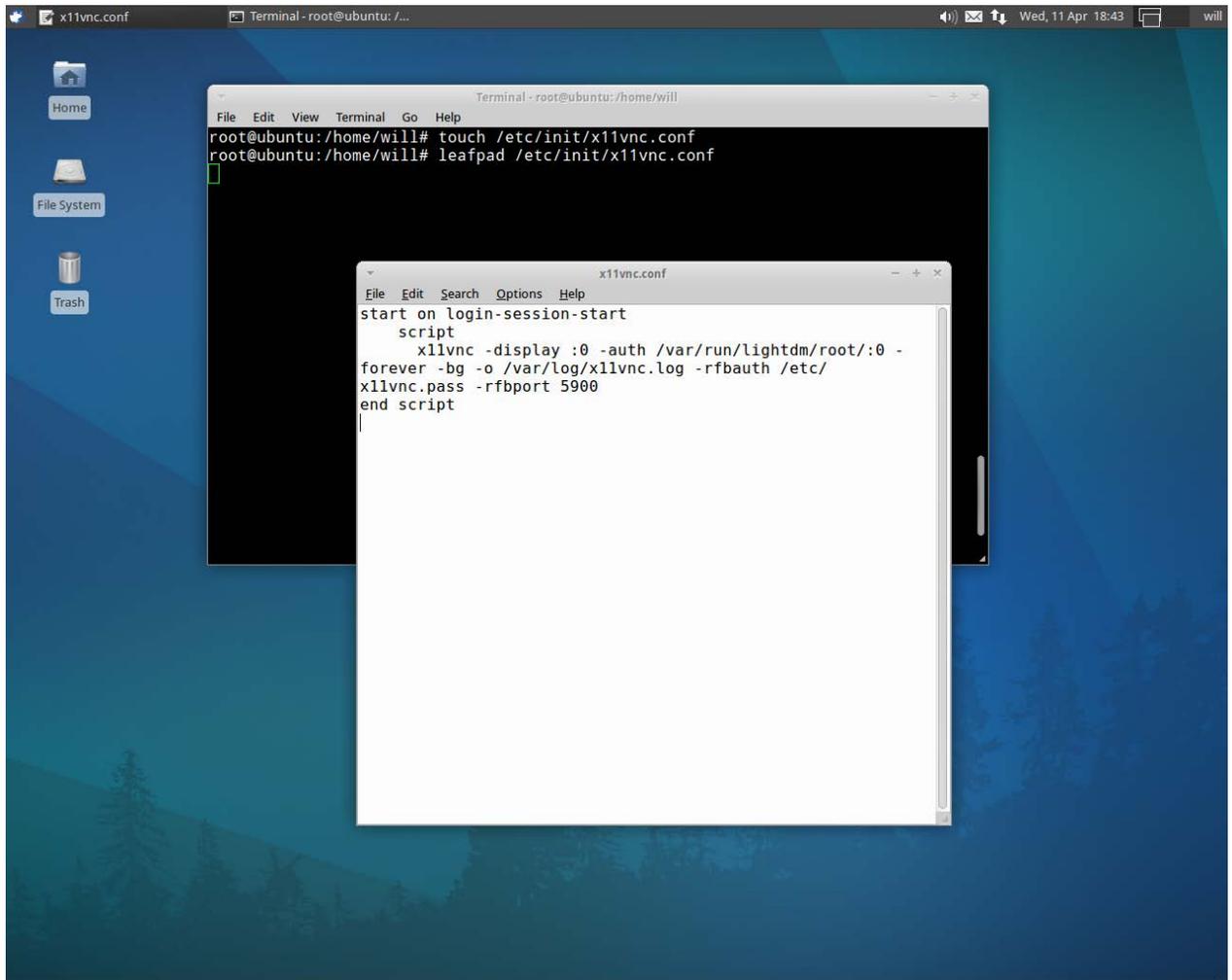
```
will@ubuntu:~$ sudo apt-get install x11vnc
Reading package lists... Done
Building dependency tree
Reading state information... Done
x11vnc is already the newest version.
0 upgraded, 0 newly installed, 0 to remove and 4 not upgraded.
will@ubuntu:~$ █
```

Xubuntu doesn't come with a VNC server pre-installed, but it is possible to set up. Begin by opening a terminal window and running "sudo apt-get install x11vnc". In the case shown here, it had already been downloaded using a graphical tool. But impress your Windows friends by doing it this way.

A terminal window titled "Terminal - will@ubuntu: ~" with a menu bar containing "File", "Edit", "View", "Terminal", "Go", and "Help". The terminal output shows the following sequence of commands and responses:

```
will@ubuntu:~$ sudo x11vnc -storepasswd password /etc/x11vnc.pass
stored passwd in file: /etc/x11vnc.pass
will@ubuntu:~$ su
Password:
su: Authentication failure
will@ubuntu:~$ █
```

Now we have to set up a VNC password (although depending on how you connect, it won't end up being called for, and the host will ask you if you want to allow the connection) – "password" in this example. Enter "sudo x11vnc -storepasswd password /etc/x11vnc.pass". The command and the results are highlighted. Ignore the author's failed attempt to switch to the superuser. By the way, if you want to do that, you can enter "sudo su", because in Ubuntu you have act as the superuser to become the superuser. Truly sublime.



Actually, let's do that now, if you want to have VNC running when Xubuntu starts. Enter "sudo su" and your prompt will change to the one shown above. Enter "touch /etc/init/x11vnc.conf" to create (or poke, if it exists) the configuration file, then enter "leafpad /etc/init/x11vnc.conf" to use a handy text editor. Enter the following lines:

```
start on login-session-start
script
  x11vnc -display :0 -auth /var/run/lightdm/root/:0 -forever -bg -o /var/log/x11vnc.log -rfbauth
  /etc/x11vnc.pass -rfbport 5900
end script
```

The screenshot shows a Firefox browser window with the address bar displaying `www.tightvnc.com/download.php`. The page title is "Download TightVNC" and the sub-header reads "Free, Lightweight, Fast and Reliable Remote Control / Remote Desktop Software".

**Highlights:**

- [TightVNC 2.0.4](#)
- [Java Viewer 2.1](#)

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**Licensing Terms**

There are **two licensing options** available for TightVNC software:

1. GNU General Public License version 2 (often abbreviated as GNU GPL). This is the default licensing option. **It's completely free** but it does not allow integration with closed-source products. Read the complete text of the license [here](#) (opens in a new window).
2. Commercial source code license. Unlike GPL, it allows integrating the software into proprietary products, although it's not free. Commercial licensing option is not applicable to all TightVNC components. [Read more about commercial licensing.](#)

**Download TightVNC version 2.0.4 for Windows**

TightVNC 2.0.4 supports all client and server versions of Microsoft Windows starting at Windows 2000, up to Windows 7.

Download TightVNC using the links below:

- [Self-installing package for Windows](#) (662,448 bytes)
- [TightVNC Server — C++ source code in a ZIP archive](#) (1,324,074 bytes)
- [TightVNC Viewer — C++ source code in a ZIP archive](#) (1,104,554 bytes)
- [TightVNC installation script for NSIS install system](#) (approx. 30KB)

**Download TightVNC Java Viewer version 2.1**

[TightVNC Java Viewer](#) 2.1 can work on any system where Java is supported. It requires Java Runtime Environment version 1.6 or any later version.

- [TightVNC Java Viewer JAR in a ZIP archive](#) (155,755 bytes)
- [Java source code in a ZIP archive](#) (161,075 bytes)
- [What is TightVNC Java Viewer 2?](#)

**Older Versions**

[version working in Windows 95/98/ME, Windows NT 4.0, or in Unix-like](#)

**More Free Downloads**  
from TightVNC Group:

[TightProjector](#)

An easy way to broadcast your Windows desktop to the local network.

[New Site License: \\$99 for unlimited number of copies!](#)

[info](#) | [download](#) | [purchase](#)

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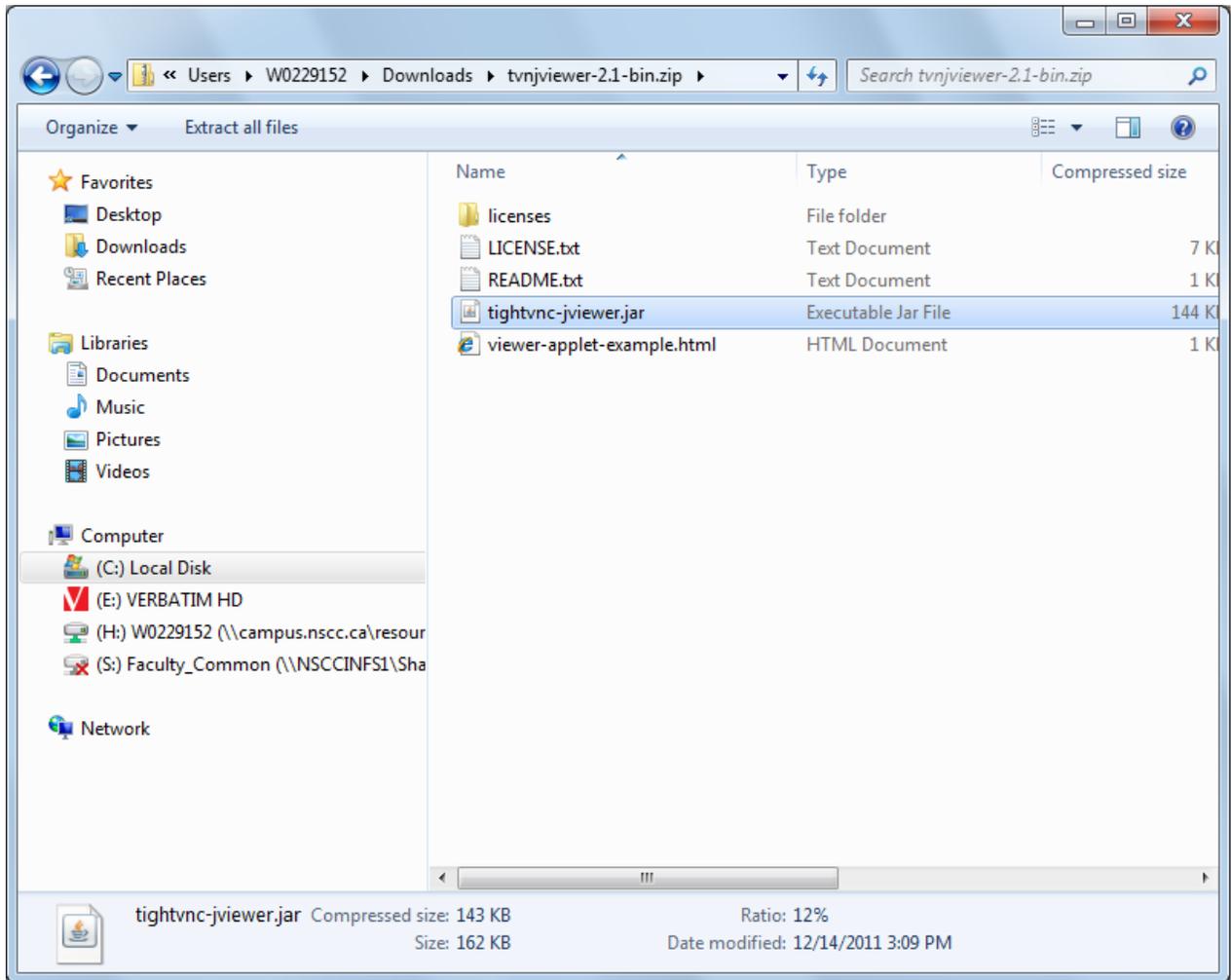
Tweet 40

Like 601 likes. Sign Up to see what your friends like.

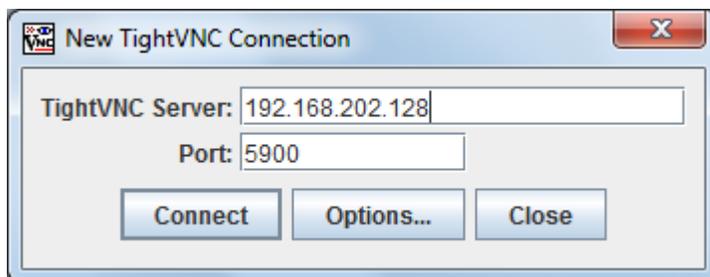
[We have open vacancies!](#)  
Join the TightVNC project and GlavSoft company in Tomsk, Russia! [rus]

The browser's address bar shows the URL: `http://www.tightvnc.com/download/2.0.4/tightvnc-2.0.4-setup.exe`

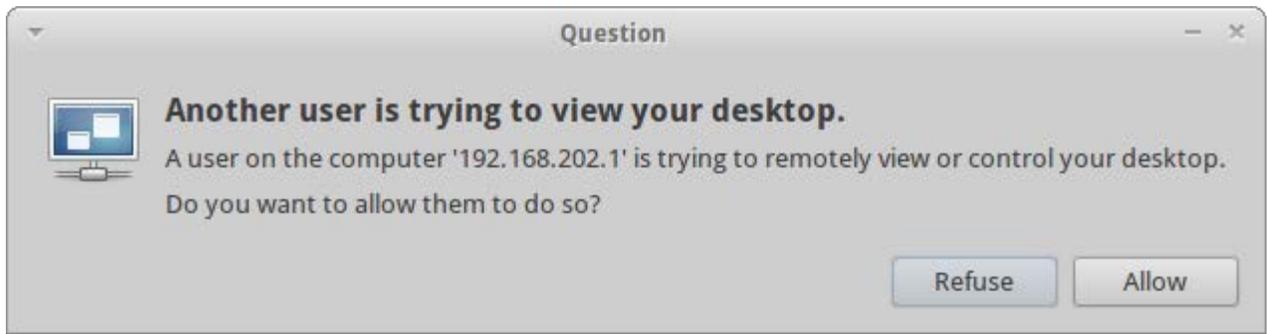
Now we're ready to test it out. On another machine, go to [tightvnc.com](http://tightvnc.com) and download the TightVNC viewer of your choice. We're going to use the Java version, so we'll click "TightVNC Java Viewer JAR in a ZIP archive".



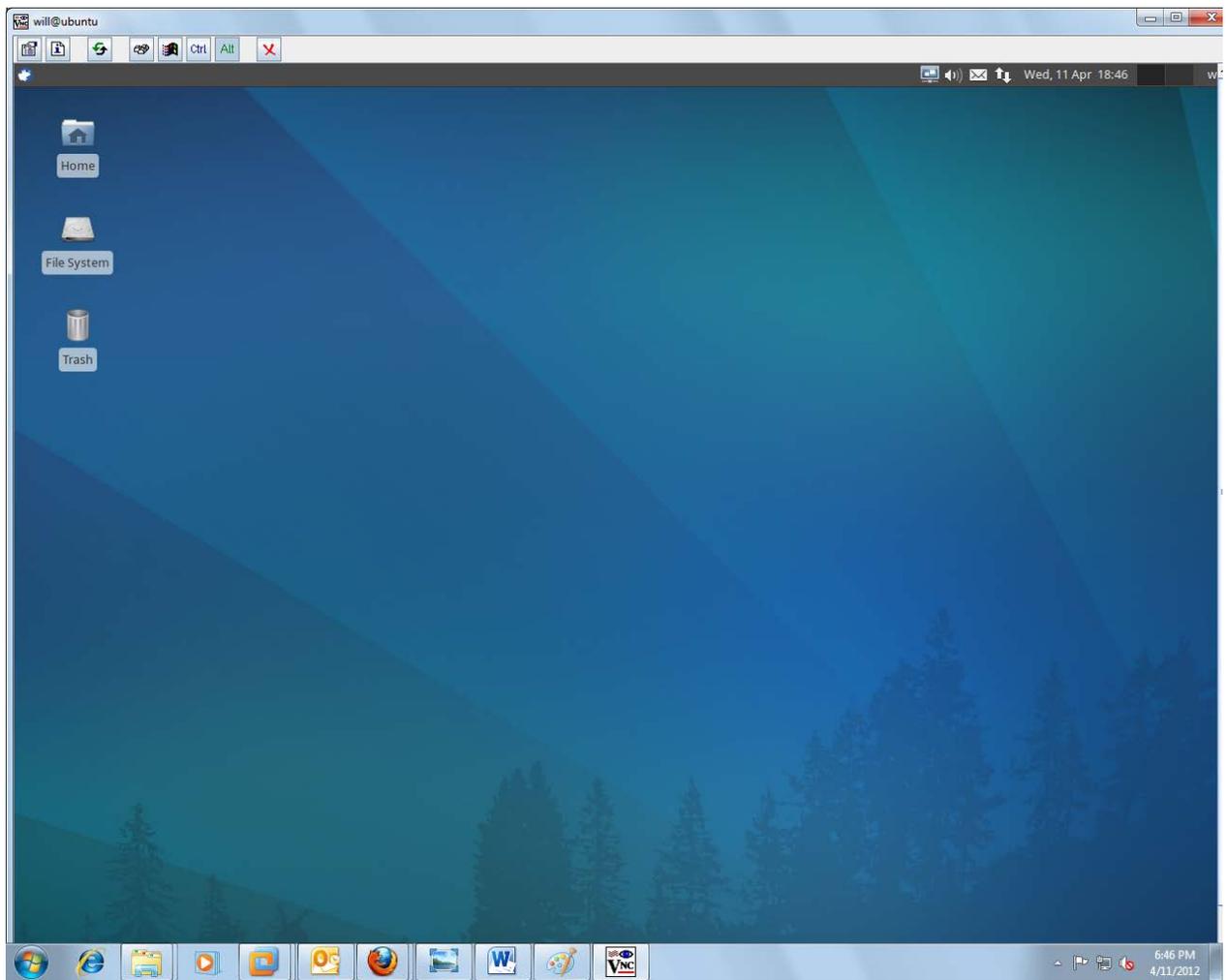
From Windows 7, you can simply waltz into the archive and execute the JAR without even having to extract it first. (That'll happen, but it'll happen behind-the-scenes.)



You'll see this window. Enter your Xubuntu IP address (if you don't know it, run "ifconfig" from a terminal as discussed previously) and stick with port 5900. Click connect. You may be asked for a password – enter the one we made earlier, and you're in.



If you're *not* asked for a password, the TightVNC client will show you a blank screen, but on your Xubuntu machine, you'll see the above dialog. "Allow" the connection.



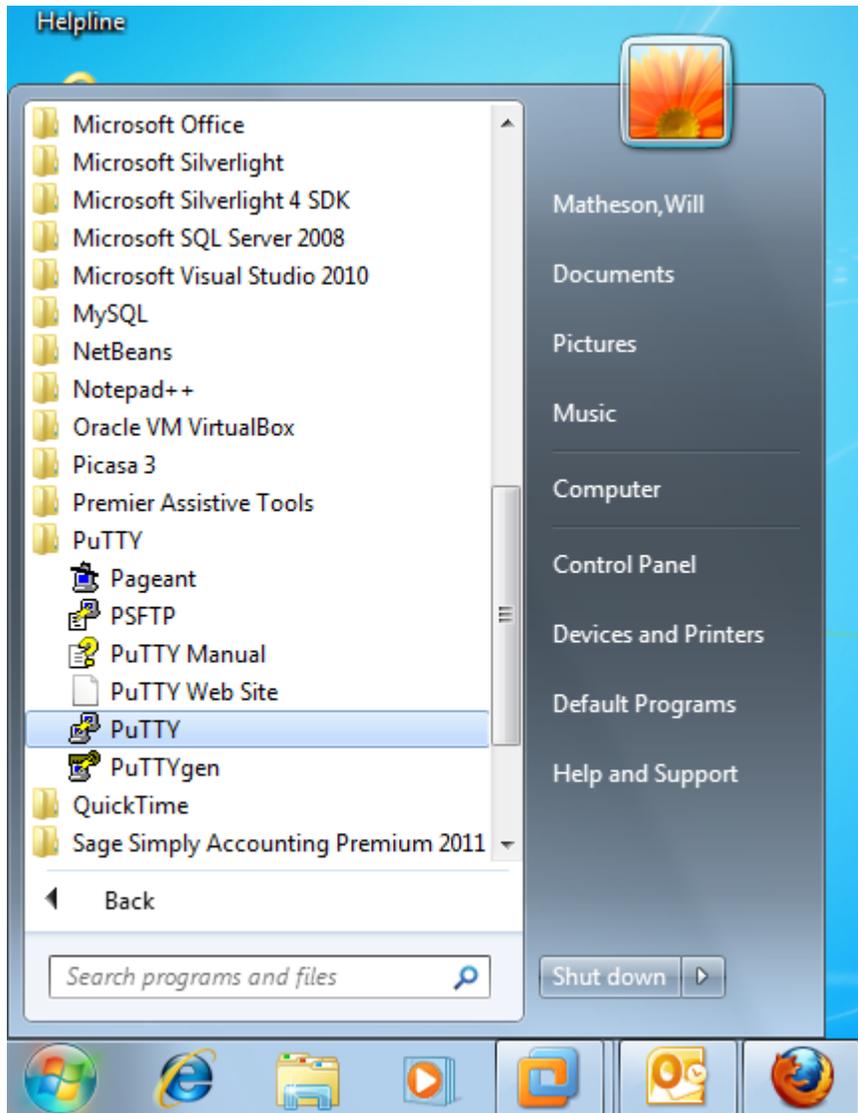
*La voici.*

Finally, we're left with SSH.

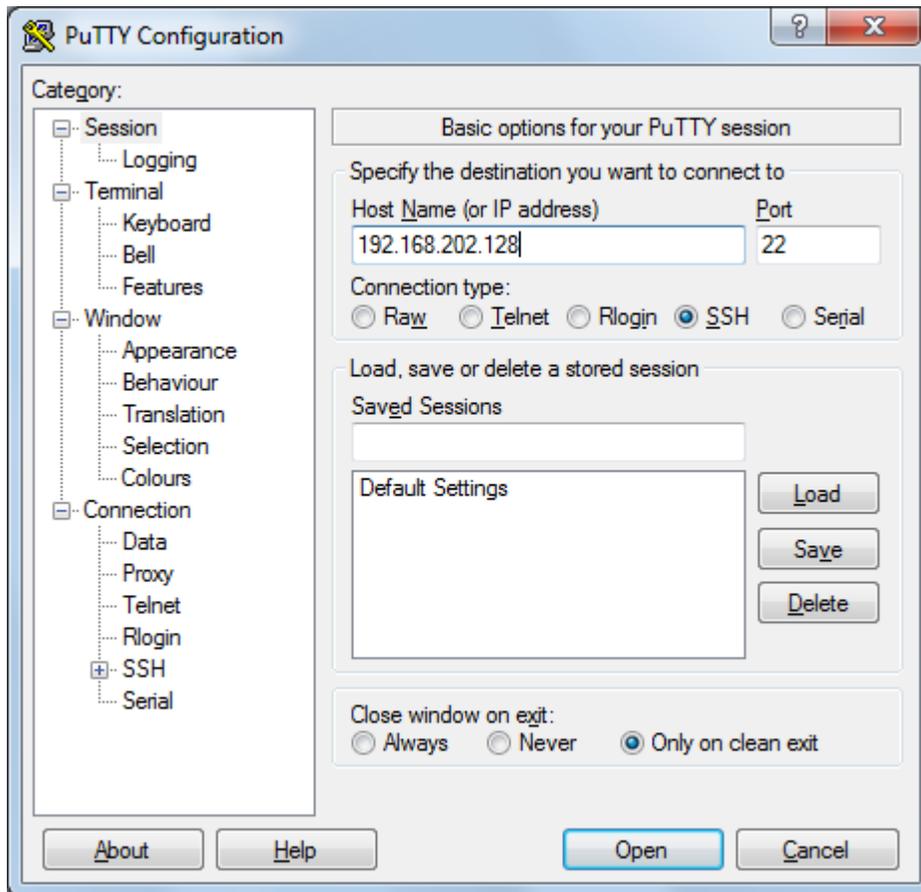
## Secure Shell (SSH)

SSH uses a secure, encrypted channel to transmit data over potentially unsecure networks. This is much safer than transceiving plain text. To use SSH to manage a computer, it must have SSH server software and be running the service, and the client must have SSH client software.

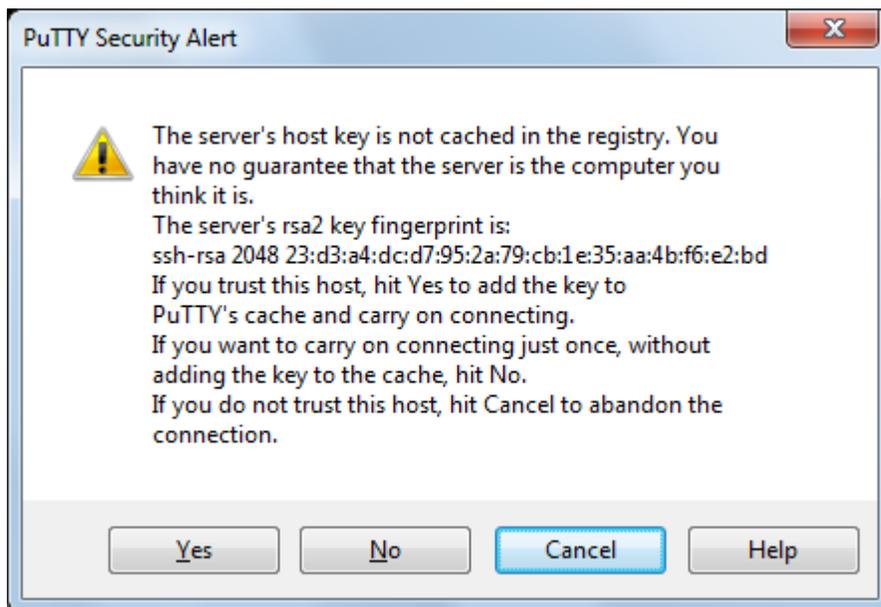
Mercifully, Xubuntu comes with an SSH service ready to go out-of-the-box. All we have to do is connect, knowing the IP address of the machine (run "ifconfig" in its terminal, if you need to).



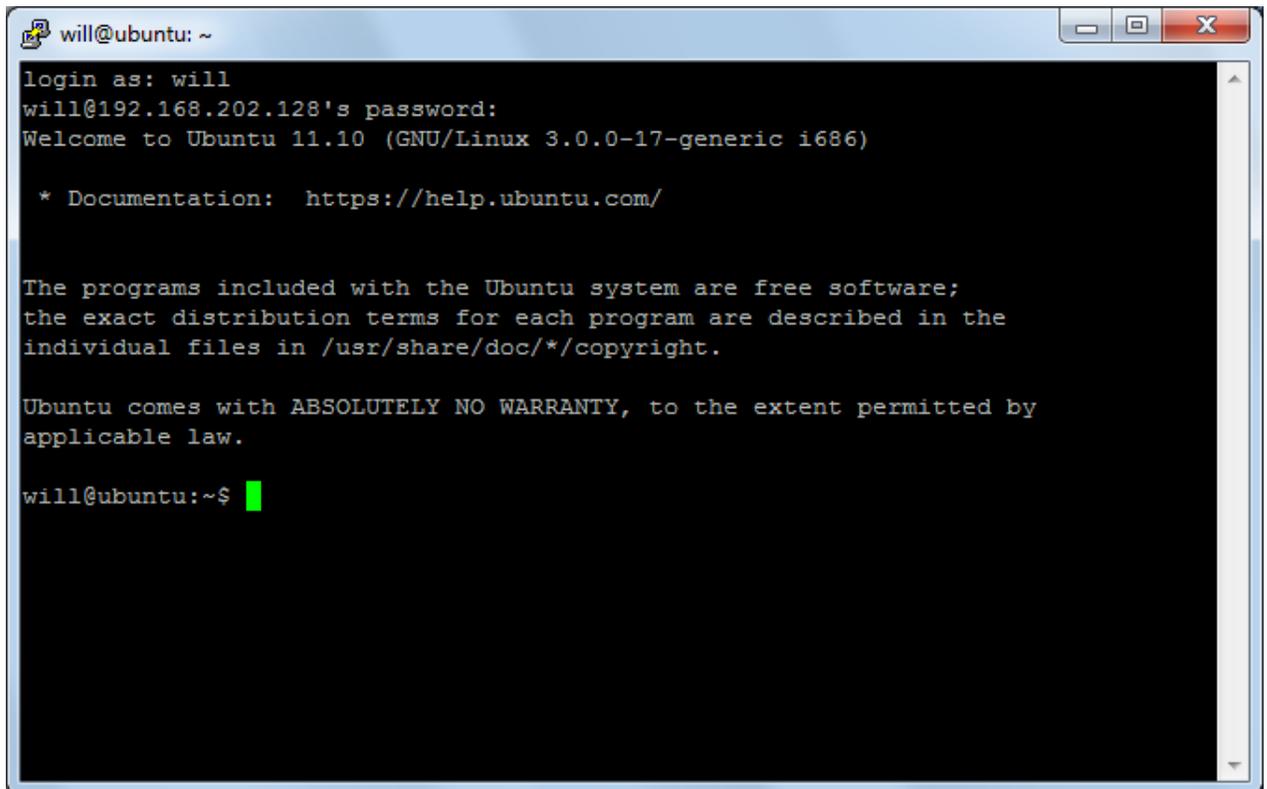
A simple client for Windows is PuTTY by Simon Tatham, freely available from the [PuTTY webpage](#).



Enter the IP address of the Xubuntu machine under “Host Name (or IP address)”. Leave the Port set to 22. Press “Open” to begin.



You will always see this screen the first time you connect to a particular host. Click “Yes”.

A terminal window titled "will@ubuntu: ~" with standard window controls (minimize, maximize, close). The terminal text is as follows:

```
login as: will
will@192.168.202.128's password:
Welcome to Ubuntu 11.10 (GNU/Linux 3.0.0-17-generic i686)

* Documentation:  https://help.ubuntu.com/

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

will@ubuntu:~$
```

Sign in with your Xubuntu user credentials and you're good to go!

We hope this brief memo has been informative and elucidating. On behalf of Squeaker and the entire Xubuntu VM, this is Will Matheson saying goodbye from Studio D309.