

How-To Guide

Install Ubuntu Linux on USB Hard Drive



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Introduction

This document is a member of the 'How-To' series of guides provided to interested parties by malware-hunters.net. In this guide, we walk you through the steps to install Ubuntu Linux 10.04 on an external USB hard drive.

Installing Ubuntu Linux on an external USB hard drive is a handy way to have access to a complete Linux installation without sacrificing a dedicated workstation or laptop. I carry several external Ubuntu Linux drives with me, each configured for a specific purpose.

Requirements

You will need three things to install Ubuntu Linux on an external USB drive:

A workstation or laptop.

You will need a host computer to serve as a 'bridge' between the Ubuntu install CD/DVD and the external USB hard drive.

A CD/DVD containing the Ubuntu 10.4 Desktop distribution.

You will create this CD/DVD by downloading an ISO image from the Ubuntu web site. Next, you will *burn*, not copy, the ISO image to a CD/DVD. This will be the medium you use to install Ubuntu Linux on the USB drive.

An external USB hard drive.

External USB hard drives are readily available at your local computer store. They are inexpensive, very compact, and reasonably rugged. I purchased the Seagate USB drive used in this guide from Wal-Mart for less than \$40.

Creating the Ubuntu 10.04 Install CD/DVD

In this step, you will download the Ubuntu 10.04 Desktop ISO from the Ubuntu web site and burn it to a CD/DVD.

Fire up your browser of choice and head out to <http://www.ubuntulinux.org/desktop/get-ubuntu/download>. From the dropdown choose the "Ubuntu 10.04 LTS – Long Term Support" release. Also choose the 32-Bit version unless you have some compelling reason to go the 64-bit route. If you prefer to install the latest release, download the 10.10 version. Click on the download button and save the ISO image to your workstation hard drive.

Burn the ISO to a CD/DVD

The ISO you just downloaded is a compressed image of the Ubuntu 10.04 installation CD/DVD. In order to create your own copy of the Ubuntu installation CD/DVD, you must uncompress the ISO image and place the individual files and folders it contains on your CD/DVD. You do this by 'burning' the ISO image to your CD/DVD. This process is very intuitive to those of you familiar with ISO images. It is *very* confusing to people who have never done it before.

Install Ubuntu Linux on USB Hard Drive

The *burning* of an ISO image is not the same as copying it. To burn the ISO image you must use an ISO burning tool. How you get this done depends on the operating system of your host computer.

If you are using Windows 7, Microsoft has finally provided the ability to burn an ISO from the Explorer shell. Using the file explorer, highlight the Ubuntu 10.04 ISO file and right-click it. Select 'Burn disk image' from the popup menu. Click on the 'Burn' button to create your install CD/DVD. See Figure 1 below.

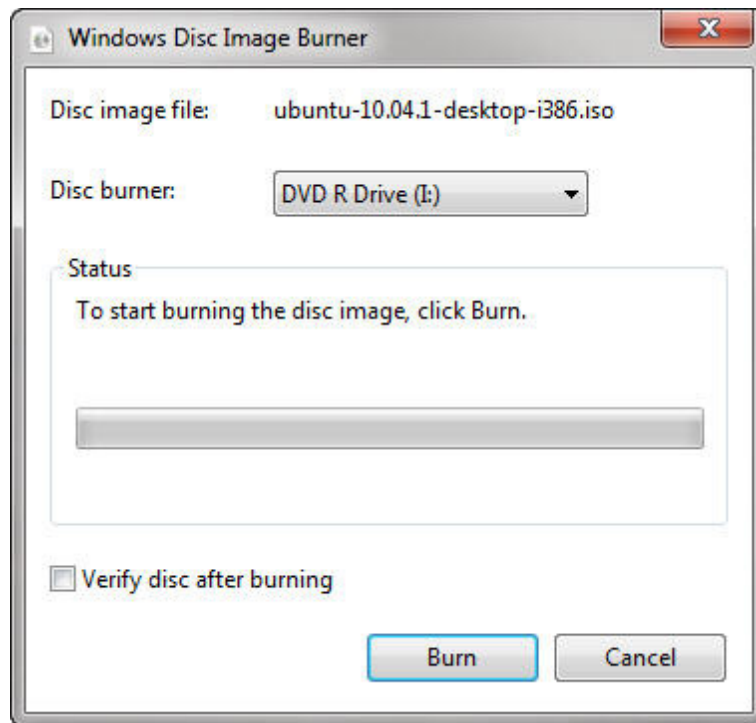


Figure 1 – Windows 7 Image Burner Dialog

If you are using Windows XP or Windows 2000, you can download a free tool named InfraRecorder from <http://infrarecorder.com/>. I have used this tool for many years and it has never failed me.

Download the tool and install it. Once installation is complete, run the application. You will be presented with the main window shown in Figure 2.

Install Ubuntu Linux on USB Hard Drive

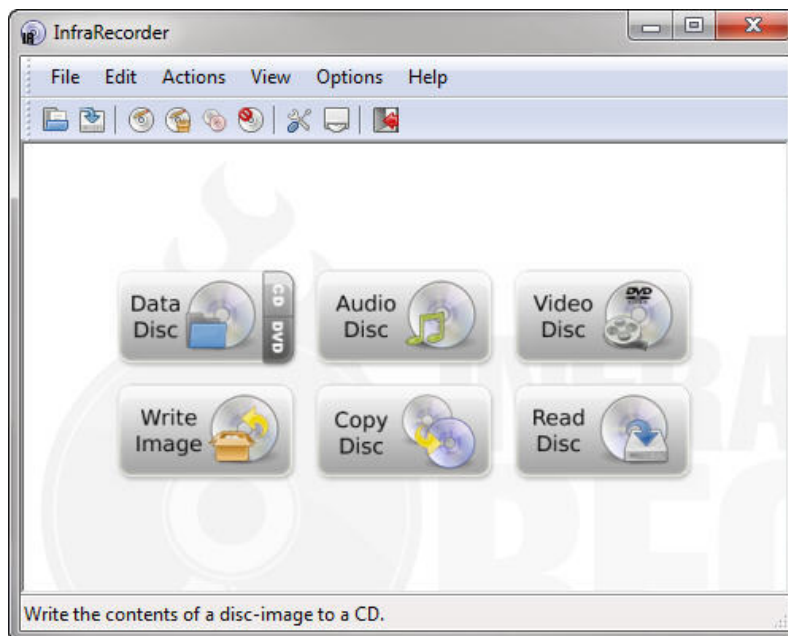


Figure 2 – InfraRecorder Main Window

Click on the 'Write Image' button and select your Ubuntu 10.04 ISO file. Click on the 'OK'.button (Figure 3).

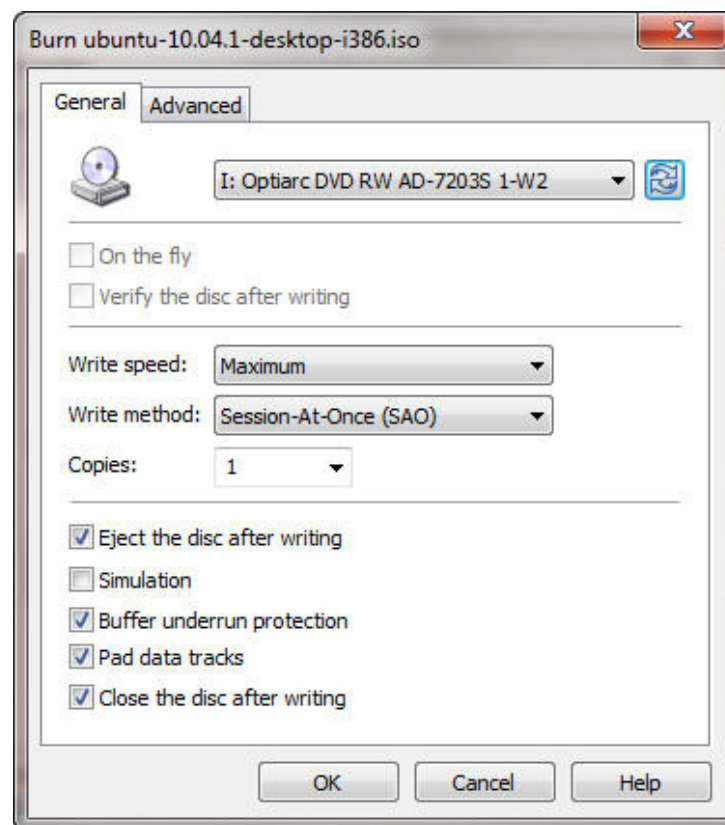


Figure 3 – InfraRecorder Burn ISO Window

Install Ubuntu Linux on USB Hard Drive

If your host is running Ubuntu Linux, you can use the Brasero image burning tool. From file explorer, highlight your Ubuntu ISO image and right-click (Figure 4).

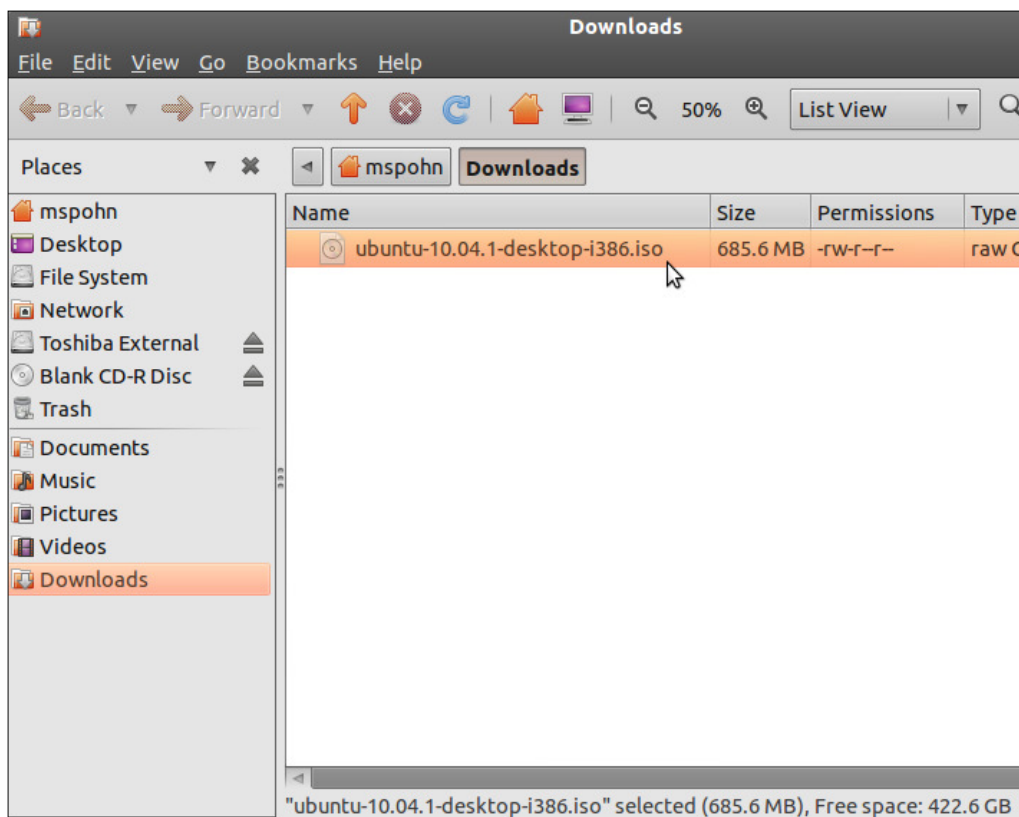


Figure 4 – Ubuntu Linux File Explorer

From the pop-up menu select “Open with Brasero Disk Burner.” Click the “Burn” button shown in Figure 5.

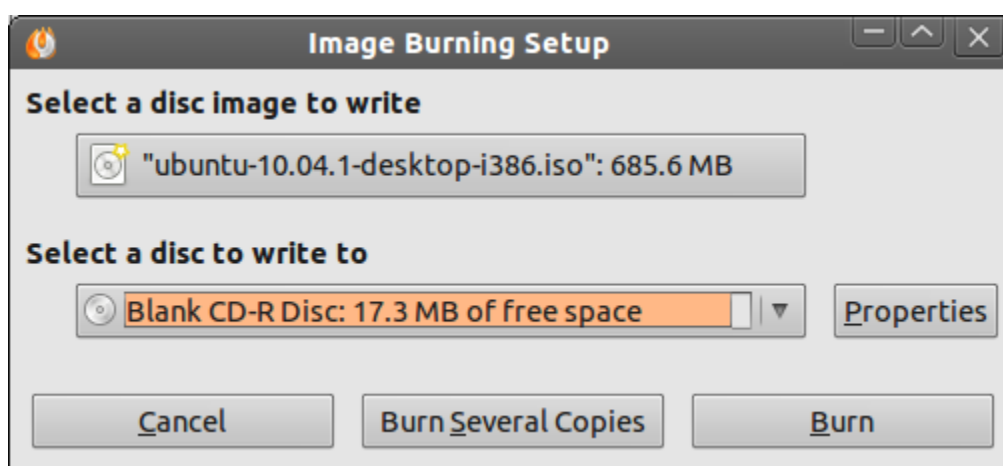


Figure 5 – Brasero Image Burning Dialog

Install Ubuntu Linux on USB Hard Drive

Whichever tool you use to burn your ISO image to a CD/DVD, let's make sure you *burned* it and not *copied* it. Open up File Explorer and look at the contents of your CD/DVD. If you see a list of files as shown in Figure 6, then you burned your CD/DVD correctly.

Name	Date modified	Type	Size
Files Currently on the Disc (13)			
.disk	8/16/2010 3:18 AM	File folder	
casper	8/16/2010 3:19 AM	File folder	
dists	8/16/2010 3:18 AM	File folder	
install	8/16/2010 3:19 AM	File folder	
isolinux	8/16/2010 3:19 AM	File folder	
pics	8/16/2010 3:18 AM	File folder	
pool	8/16/2010 3:18 AM	File folder	
preseed	8/16/2010 3:18 AM	File folder	
autorun.inf	8/16/2010 3:17 AM	Setup Information	1 KB
md5sum.txt	8/16/2010 3:19 AM	Text Document	5 KB
README.diskdefines	8/16/2010 3:18 AM	DISKDEFINES File	1 KB
ubuntu	8/16/2010 3:19 AM	File	0 KB
wubi.exe	7/8/2010 9:55 AM	Application	1,434 KB

Figure 6 – Ubuntu Install CD/DVD File List

If you only see one file with a .iso extension on the CD/DVD, then you copied it instead of burned it. Toss the CD/DVD in the trash, slow down, then re-read this section a little closer.

Obtain an External USB Hard Drive

For this 'How-To,' I used a Seagate Free-Agent Go 320GB external USB drive (Figure 7). Details of this product can be found [here](#).



Figure 7 – Seagate Free Agent Go External USB Drive

These types of drives are available at any local store that sells computer supplies. Expect to pay around \$40 US for a 320GB model. I prefer the smaller capacity drives because they have a smaller form factor and are easier to carry around in my laptop bag..

Install Ubuntu Linux on External USB Hard Drive

You should now have on your desk or workspace a CD/DVD containing the Ubuntu Linux install files and an external USB hard drive. I will now walk you through the process of installing Ubuntu Linux on the USB drive.

Place the CD/DVD into the CD/DVD drive of your host computer.

Plug your external USB hard drive into an unused USB port on your host computer.

Reboot your host computer and ensure it boots from the CD/DVD drive.

Depending on the boot order sequence stored in your computer's BIOS, the CD/DVD drive may be the first device in the boot order. If so, your host computer should boot from your Ubuntu install CD/DVD.

Most modern computer BIOS' have a 'one-time' boot menu that is accessed by pressing a key early in the boot process. For example, most Dell computers use the F12 key to access the boot menu. Other computers may use key F10, F2, etc.

You may have to resort to changing the boot priority in your BIOS if the CD/DVD is not at the top of the boot sequence or you do not know the key to press to get to the 'one-time' boot menu.

Begin the Ubuntu install process

You should now have your host computer booted from the Ubuntu install CD/DVD you created earlier. We will next walk through the Ubuntu installation process, installing a bootable version of Ubuntu Linux on your external USD drive.

It is very important that you pay close attention to the steps in this install process. If you are not careful, you may end up wiping out the file system(s) on your host computer. This would not be good. We want Ubuntu to install on the external USB drive, *not* a drive on your host computer.

To get started, make sure your host computer is displaying the Ubuntu install screen shown below in Figure 8.

Install Ubuntu Linux on USB Hard Drive

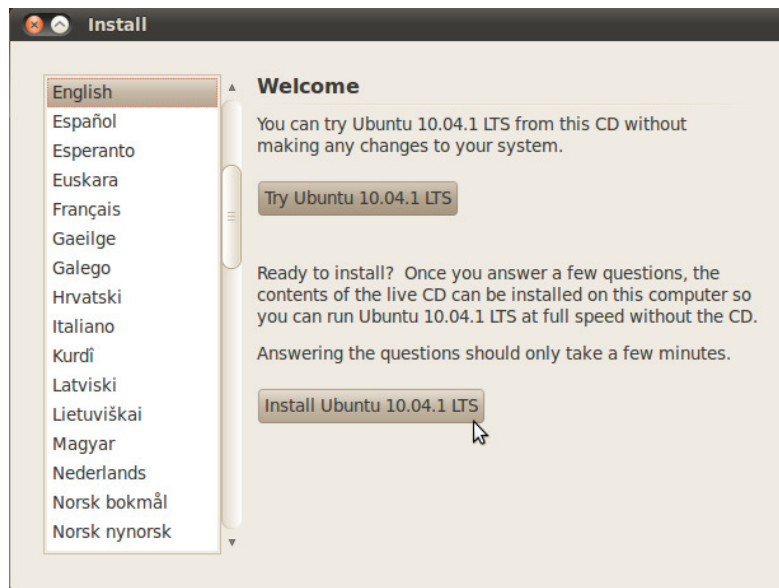


Figure 8 – Ubuntu 10.04.1 Install Dialog

Select your preferred language and click on “Install Ubuntu 10.04.1 LTS:

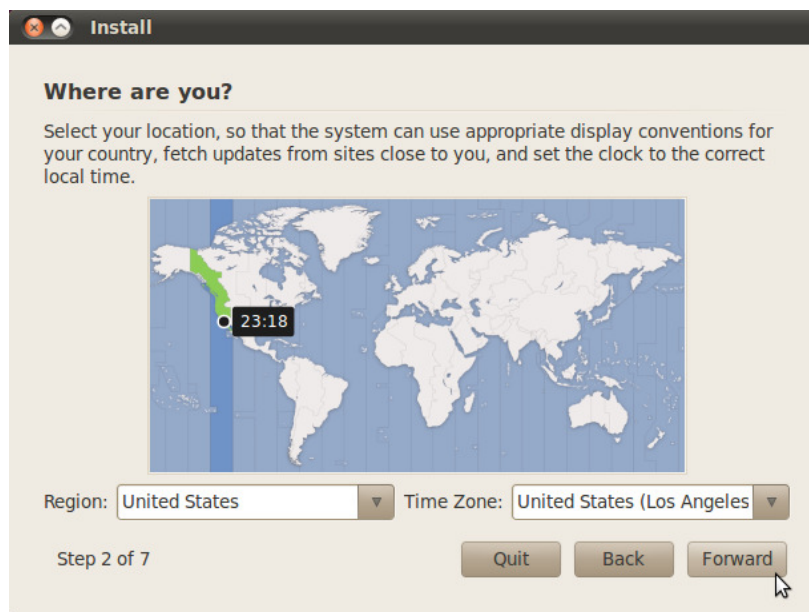


Figure 9 – Select Time Zone Dialog

Select your time zone and click “Forward.”

Install Ubuntu Linux on USB Hard Drive

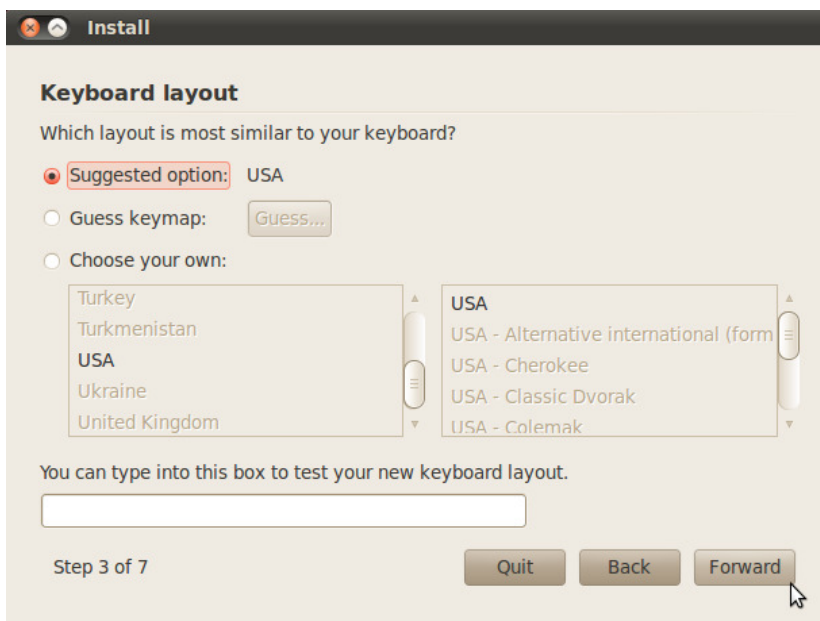


Figure 10 – Select Keyboard Layout Dialog

Choose your keyboard layout and click “Forward.”

CAUTION: Be sure you follow the next steps very carefully or you risk destroying the file system on your host computer.

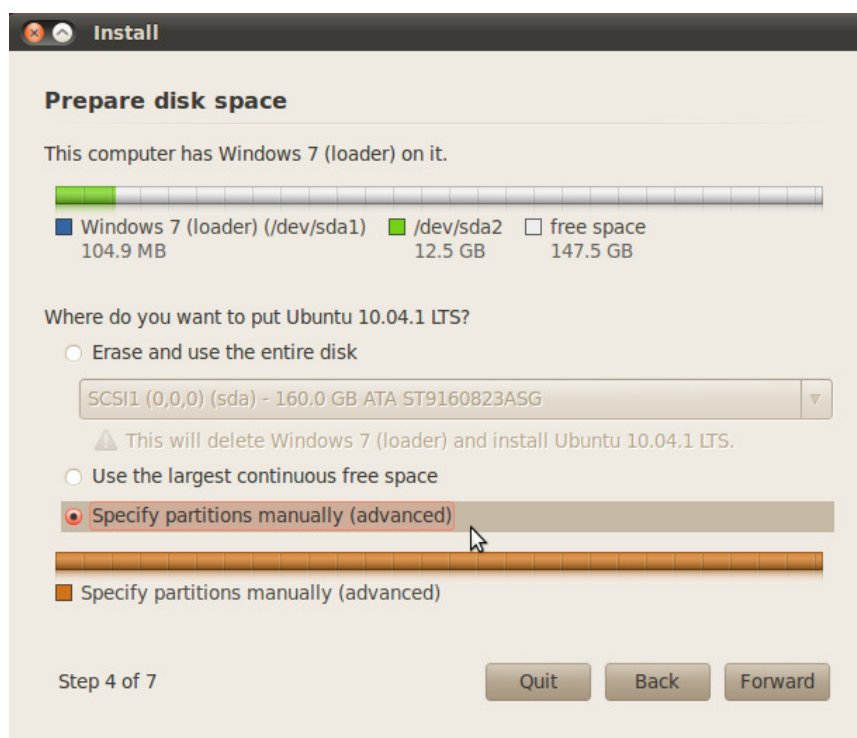


Figure 11 – Prepare Disk Space Dialog

Install Ubuntu Linux on USB Hard Drive

Take minute and look closely at Figure 11. At the top of the dialog, you can see that my host system has Windows 7 installed. The Ubuntu Linux installer shows two partitions on my host hard drive. Partition 1 (/dev/sda1) is 104.9 MB is size and contains the Windows 7 boot loader. This means partition-1 has the boot flag set. The second partition on my host hard drive (/dev/sda2) is 12.5 GB in size. Ubuntu shows the rest of the space on my host hard drive (147.5 GB) as free space.

The information shown is misleading. My host hard drive (/dev/sda) is 250 GB in size. It has two partitions. Partition-1 is @ 100MB. Partion-2 is @150 GB. I have McAfee Endpoint Encryption installed and Partition-2 is encrypted. The Ubuntu installer is obviously confused by the McAfee encryption scheme.

The above details are interesting, but not important to our task at hand. What is important is that I do not want to do anything to my host hard drive (/dev/sda). Take a close look at the dialog box on your host system and make a note of the drive(s) present on your host system. You do not want to touch these drive(s). Let's continue our install.

Click on "Specify partitions manually (Advanced)" and click "Next."

Carefully study the 'Prepare partitions' screen shot in Figure 12.

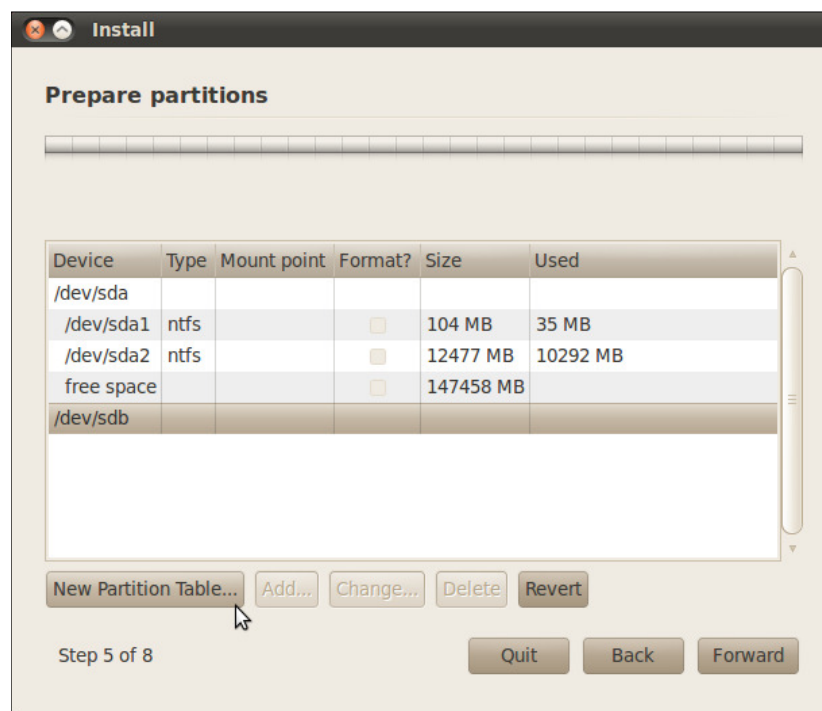


Figure 12 – Prepare Partitions Dialog-1

Notice the layout of device `/dev/sda`. Once again you see the Ubuntu install displays the layout of my host hard drive – just as we saw earlier. You also see an additional disk device `/dev/sdb`. This is my Seagate Free Agent USB drive.

The Ubuntu install does not show any details about disk device `/dev/sdb`. This is due to the fact I wiped the Free Agent USB drive with zeros. The USB drive does not have an MBR, partition table, or any file systems. All zeros from the first to the last bit.

Your USB drive probably has a file system already installed. This will most likely be NTFS or FAT32. If there is a file system installed, the “Prepare Partitions” dialog will show the partitions along with the name of the device if one was provided. The most important thing here is that you identify which disk device is assigned to your external USB disk.

In the next step we are going to create a new partition table on our external USB drive. This will allow us to create partitions for the Ubuntu file system.

You must make absolutely sure the device you select is your external USB drive. Also, make sure you highlight the device (e.g. `/dev/sdb`) and not one of its partitions. In my example, I already determined that `/dev/sda` was the internal hard drive of my host computer and I know not to go anywhere near it.

As shown in Figure-12, for my system I highlighted `/dev/sdb`. You will highlight the disk device that you *know* is your external USB device. If you are not absolutely sure which device is your USB disk, ask someone familiar with Linux to assist you. The steps you are about to take will wipe out all existing content on your external USB drive. If you select the wrong device, whatever device you select will be wiped out. You have been warned!

Install Ubuntu Linux on USB Hard Drive

Highlight your USB disk device and click “New Partition Table” (Figure-12).

As shown in Figure-13 below, you will now see a confirmation dialog alerting you are about to create an empty partition table on the device you selected. You can also see that you can undo this operation if it is not what you want. If you look closely at Figure-13 you can see that device `/dev/sdb` is the device I selected.

When you are sure you selected the right disk device - Click the ‘Continue’ button.

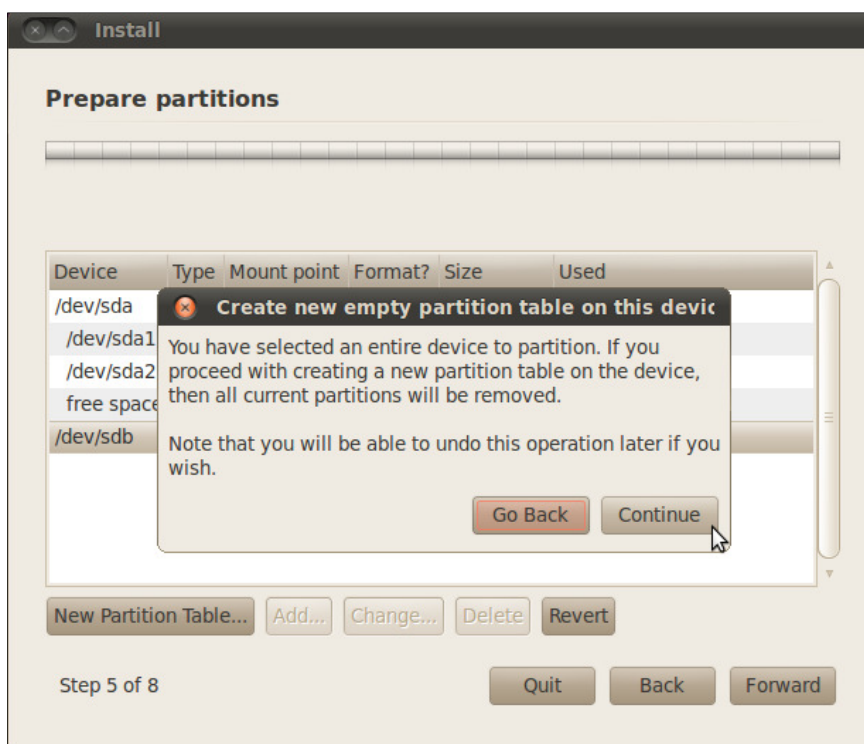


Figure 13 – Prepare Partitions Dialog-2

An empty partition will be created on your selected device. The next dialog (Figure-14) will show your external USB device has no partitions and identify all of the space on the drive is free space.

In my case, (Figure-14) shows that I have 320 GB of free space on device `/dev/sdb`. This is correct since my Seagate Free Agent external USB device is 320 GB in size.

Install Ubuntu Linux on USB Hard Drive

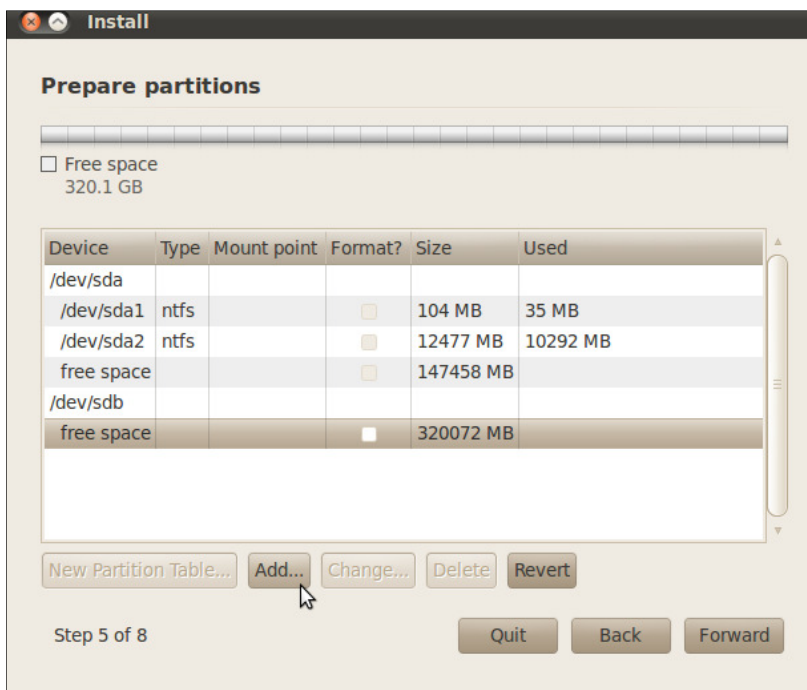


Figure 14 – Prepare Partitions Dialog-3

Create a swap partition. Highlight the free space on your external USB device and click “Add.”

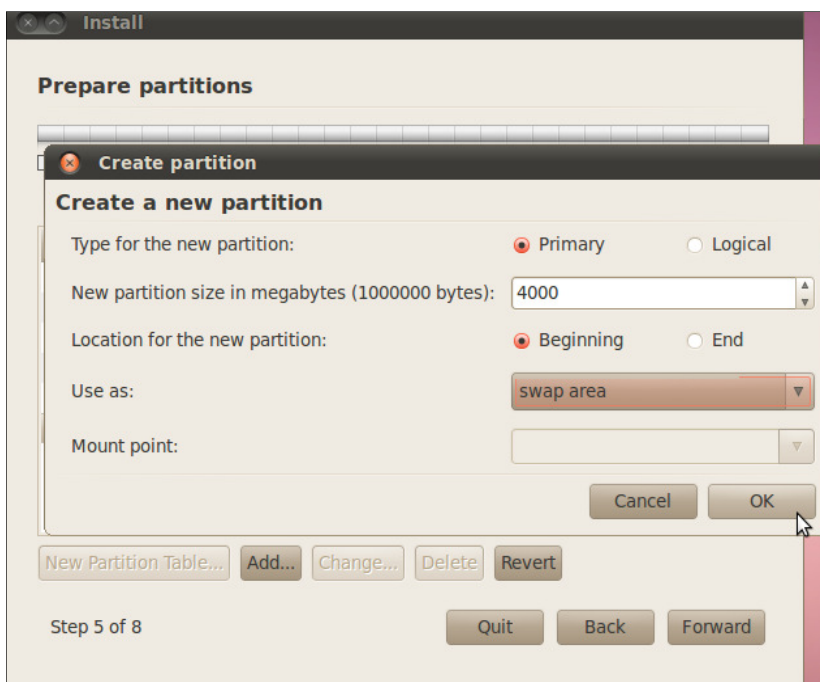


Figure 15 – Prepare Partitions Dialog- 4

Install Ubuntu Linux on USB Hard Drive

In this step we are going to create a swap partition. This is important for good performance of your Ubuntu Linux operating system. In general, you want to make your swap partition as large as or slightly larger than the total RAM you have on the system you will be running your external O/S from.

In my case, the laptop I will use with my external Ubuntu O/S has 4 GB of RAM. So, I will create a 4GB swap partition. Notice in Figure-15, I entered 4000 in the partition size text box and selected 'swap area' from the "Use as:" drop-down. You will enter in the size of the swap area you want to create depending on the size of your installed RAM.

Once you click the "OK" button, you will return to the previous dialog. Now you will see your new swap partition as shown in Figure-16 below.

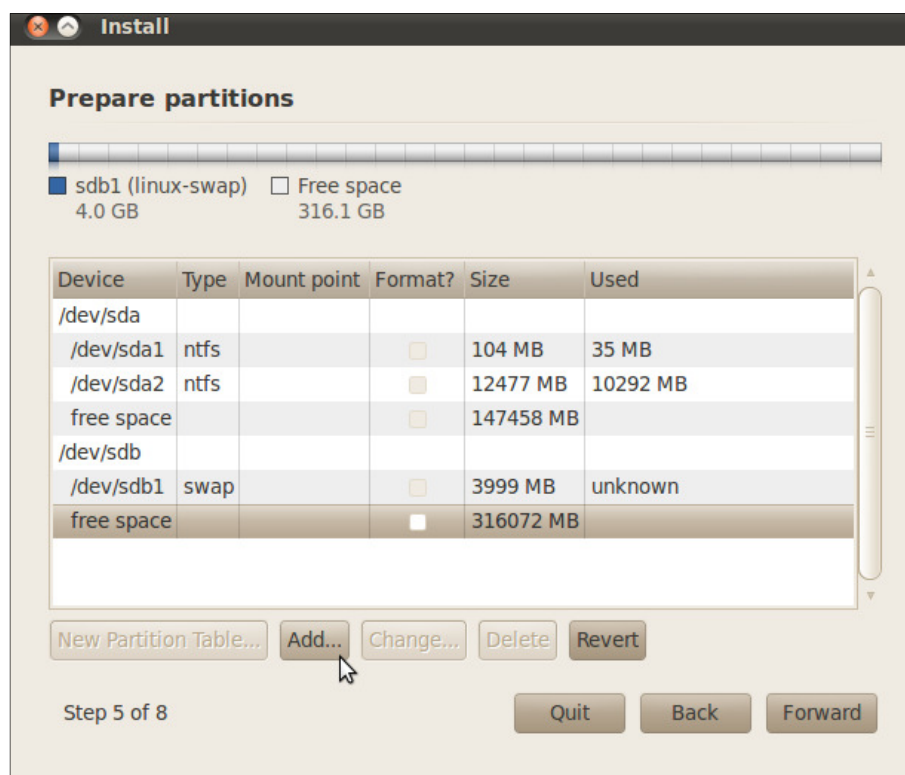


Figure 16 – Prepare Partitions Dialog-5

Install Ubuntu Linux on USB Hard Drive

Create a root (/) partition. Highlight the free space on your external USB device and click “Add.”

Here we are going to create a root partition to hold the Ubuntu Linux operating system. We follow the same steps we used to create the swap partition.

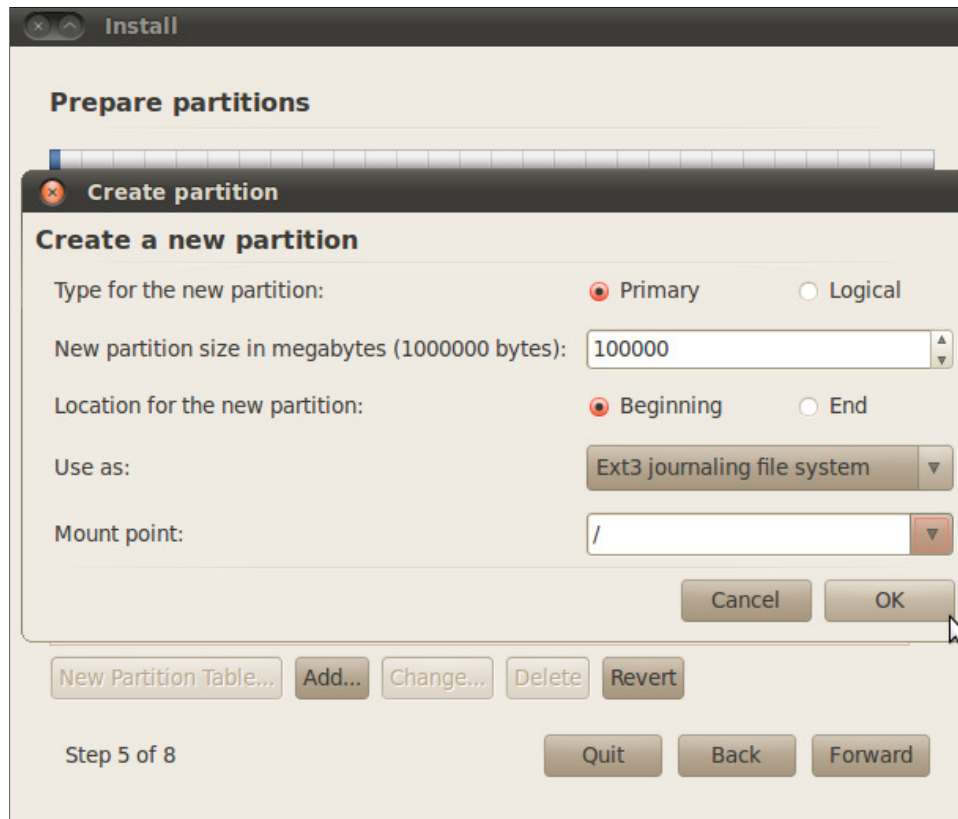


Figure 17 – Prepare Partitions Dialog-6

I chose to create a 100 MB primary partition using the Ext3 file system and chose the mount point to be '/'. This means this partition will be mounted as the root partition when Ubuntu Linux boots. You may choose to create a larger or smaller partition depending on your preferences. You may also choose to create an Ext4 file system if you want the latest and greatest.

Once you click the “OK” button, you will return to the previous dialog. Now you will see both of your partition as shown in Figure-18 on the next page.

Install Ubuntu Linux on USB Hard Drive

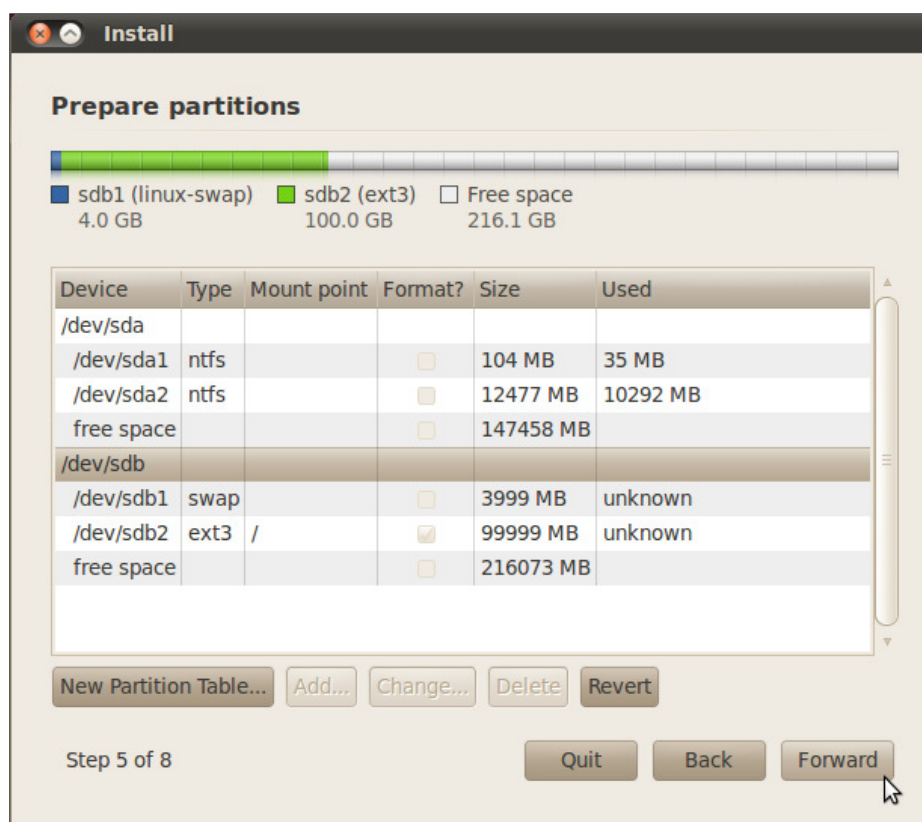


Figure 18 – Prepare Partitions Dialog-7

Provide user information and specify a hostname.

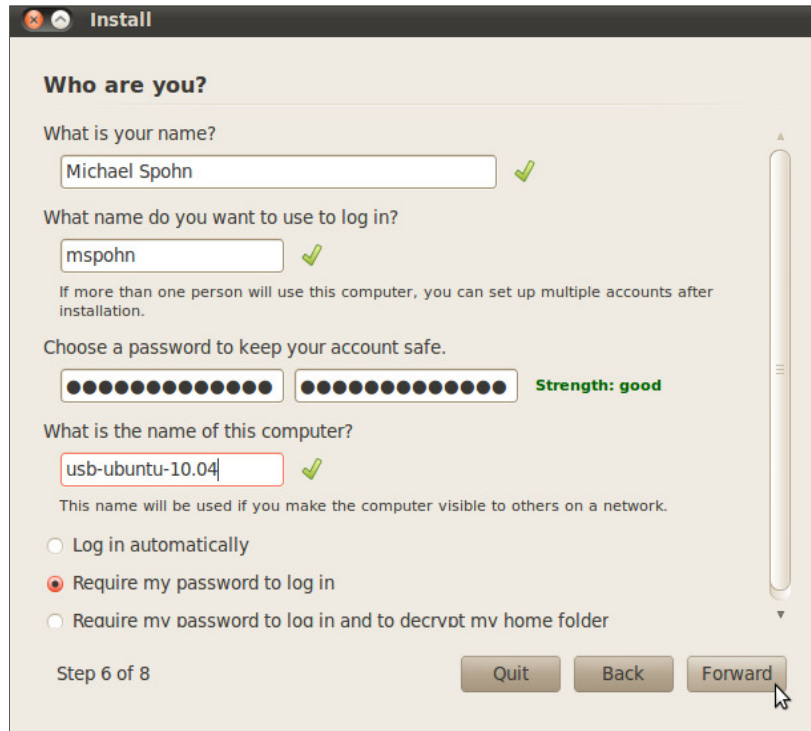
In the next step, we are going to create a new user, create security credentials and provide a hostname. Figure-19 shows the “Who are you?” dialog. You are asked to enter your name used by the system to refer to you, and a login name.

You should also provide a strong password to protect your Ubuntu installation from intruders and malicious malware. You are also asked to enter a hostname. This will become the ‘name’ of your computer on any networks.

Finally, you are given the choice of login actions. If you select ‘Log in automatically,’ the system will log you in to your desktop on boot without asking for your credentials. This is not recommended. If you choose, ‘Require my password to log in,” you will be prompted for login credentials on boot.

For the really paranoid, you can select ‘Require my password to log in and decrypt my home folder.’

Install Ubuntu Linux on USB Hard Drive

The image shows the 'Who are you?' dialog in the Ubuntu installer. It has a title bar with 'Install' and window controls. The main area contains several input fields and checkboxes. The first field is 'What is your name?' with the value 'Michael Spohn' and a green checkmark. The second is 'What name do you want to use to log in?' with the value 'mspohn' and a green checkmark. Below this is a note: 'If more than one person will use this computer, you can set up multiple accounts after installation.' The third section is 'Choose a password to keep your account safe.' with two password input fields (represented by dots) and a green checkmark. To the right of the password fields is the text 'Strength: good'. The fourth field is 'What is the name of this computer?' with the value 'usb-ubuntu-10.04' and a green checkmark. Below this is a note: 'This name will be used if you make the computer visible to others on a network.' There are three radio buttons: 'Log in automatically' (unselected), 'Require my password to log in' (selected), and 'Require my password to log in and to decrypt my home folder' (unselected). At the bottom left is 'Step 6 of 8'. At the bottom right are three buttons: 'Quit', 'Back', and 'Forward'. A mouse cursor is pointing at the 'Forward' button.

Who are you?

What is your name?
Michael Spohn ✓

What name do you want to use to log in?
mspohn ✓

If more than one person will use this computer, you can set up multiple accounts after installation.

Choose a password to keep your account safe.
[password field] [password field] Strength: good

What is the name of this computer?
usb-ubuntu-10.04 ✓

This name will be used if you make the computer visible to others on a network.

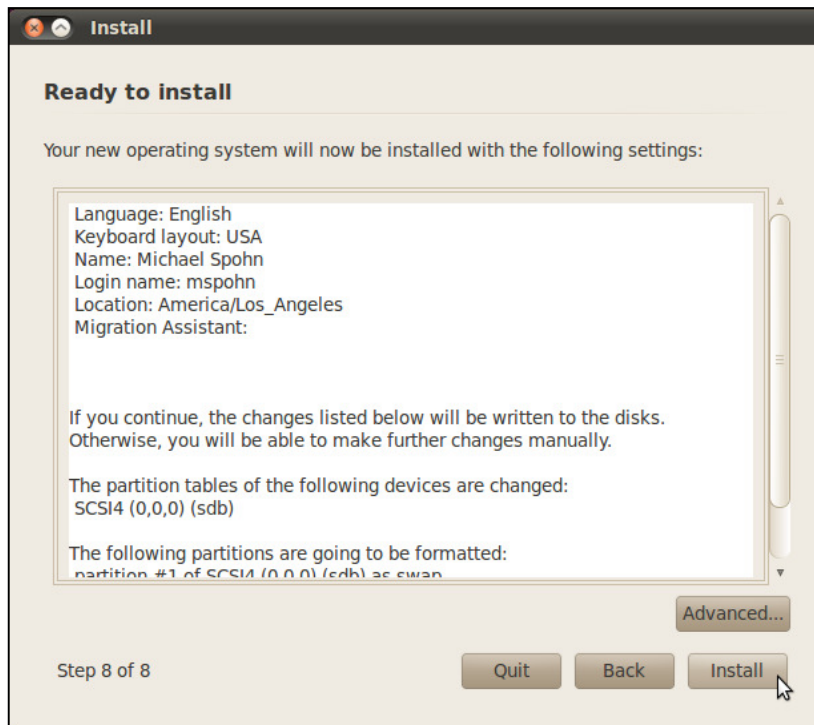
☐ Log in automatically
☒ Require my password to log in
☐ Require my password to log in and to decrypt my home folder

Step 6 of 8

Quit Back Forward

Figure 19 – Who are you? Dialog

When you are satisfied with your entries – click ‘Forward.’

The image shows the 'Ready to install' dialog in the Ubuntu installer. It has a title bar with 'Install' and window controls. The main area has a title 'Ready to install' and a subtitle 'Your new operating system will now be installed with the following settings:'. Below this is a scrollable box containing the following text: 'Language: English', 'Keyboard layout: USA', 'Name: Michael Spohn', 'Login name: mspohn', 'Location: America/Los_Angeles', and 'Migration Assistant:'. Below the scrollable box is a warning: 'If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.' This is followed by two sections: 'The partition tables of the following devices are changed: SCSI4 (0,0,0) (sdb)' and 'The following partitions are going to be formatted: partition #1 of SCSI4 (0,0,0) (sdb) as swap'. At the bottom right of the scrollable box is an 'Advanced...' button. At the bottom left is 'Step 8 of 8'. At the bottom right are three buttons: 'Quit', 'Back', and 'Install'. A mouse cursor is pointing at the 'Install' button.

Ready to install

Your new operating system will now be installed with the following settings:

Language: English
Keyboard layout: USA
Name: Michael Spohn
Login name: mspohn
Location: America/Los_Angeles
Migration Assistant:

If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.

The partition tables of the following devices are changed:
SCSI4 (0,0,0) (sdb)

The following partitions are going to be formatted:
partition #1 of SCSI4 (0,0,0) (sdb) as swap

Advanced...

Step 8 of 8

Quit Back Install

Figure 20 – Ready to Install Dialog

Install Ubuntu Linux on USB Hard Drive

Install Ubuntu Linux on your external USB drive.

Finally, we are ready to begin the install process. Review the 'Ready to Install' dialog information shown in Figure-20. When you are sure you have everything correct, click the 'Install' button. If you made mistakes or are unsure of your settings, you can click on 'Back' and change your settings.

Once you click on 'Install' you will see a series of informative pages as the installation progresses. The 'Welcome' page is shown in Figure-21.

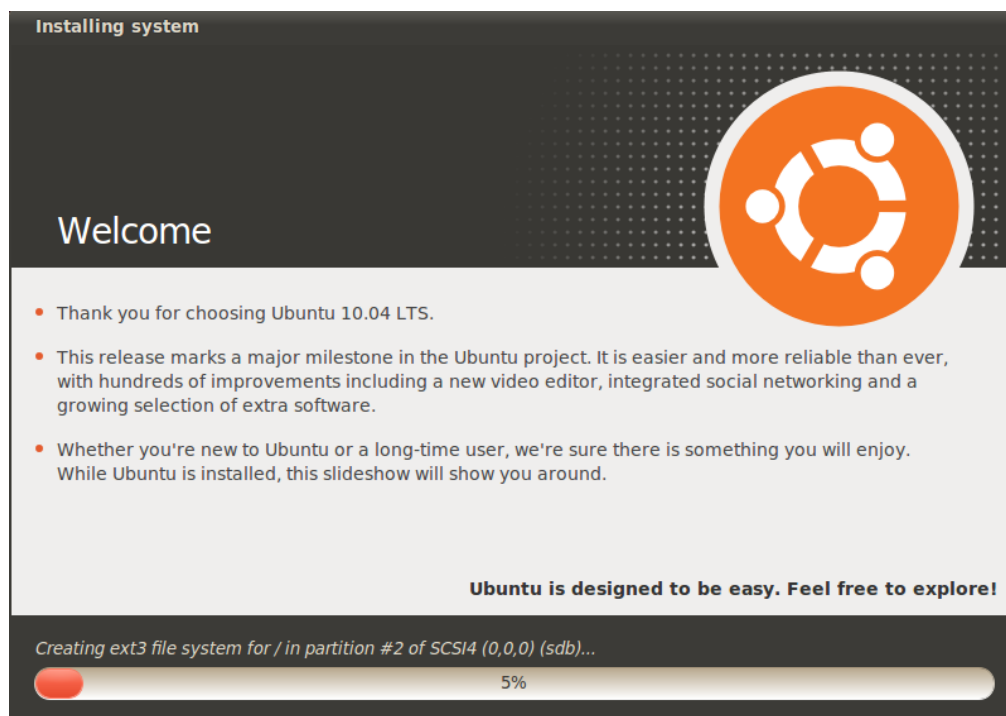


Figure 21 – Welcome Dialogs

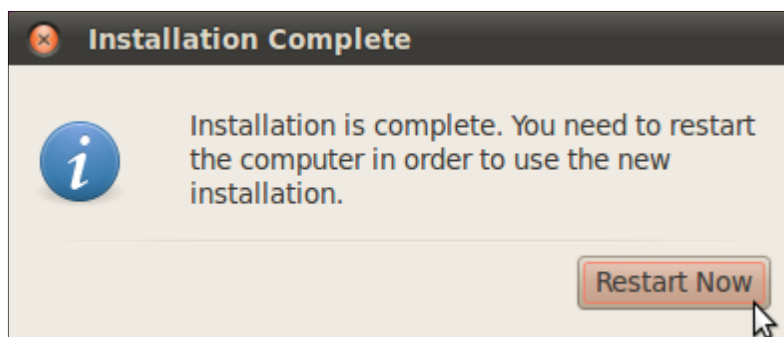


Figure 22 – Installation Complete

Once installation is complete, click on 'Restart Now' as shown in Figure-22 above.

Install Ubuntu Linux on USB Hard Drive

Boot your computer with your Ubuntu Linux external USB drive.

You will need to tell your host computer that you want to boot from an external USB drive rather than its internal disk. To do this you follow the same process you did earlier to get your host to boot from the CD/DVD.

I use the 'one-time' boot menu provided by Dell by pressing F12 at boot time. I select to boot from the USB device and I am good to go. You may have to figure out if your host has a 'one-time' boot menu.

You may have to resort to changing the boot priority in your BIOS if you do not have a boot menu available. Be aware that older computers may not have the 'smarts' in their BIOS to enable USB device booting. In this case you will have to find another host computer to boot from.

This 'How-To' provides a step-by-step guide to installing Ubuntu Linux on an external USB hard drive. Having an external drive with a Linux installation is very handy tool for IT support personnel, system administrators, and incident responders.

If you have any feedback about this guide please email me (mspohn@malware-hunters.net) or visit our blog at www.malware-hunters.net.