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Beginning Ubuntu for Windows and Mac Users

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Nathan Haines

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For Alexander, who eats everything, will try anything, and is constantly learning.

Contents at a Glance

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About the Author

Nathan Haines is an author, instructor, speaker, and computer consultant who fell in love with Ubuntu in 2005, and helped found the Ubuntu California Local Community Team to share that excitement with others. As a current leader of the Ubuntu California Local Community team and a member of the Ubuntu Local Community Council, he works to help others share Ubuntu worldwide.

He got started in IT support during high school, when he got an after-school job helping the campus technician and later worked over the summer at his high school, then his school district, and finally at his college, learning technical writing along the way. He later taught computing classes to professionals and worked his way up to the highest levels of technical support and consumer service.

When not working with computers, he's more than likely admiring the latest Nintendo hardware, wishing he had more time for retro console and PC gaming, and indulging in linguistic curiosity by studying German or dabbling in Old English or Tolkien's constructed Elvish languages. The queue of sci-fi and fantasy books on his Kindle is probably growing instead of shrinking, although sometimes camping trips help with that.

Despite a knowledge of HTML that was forged in 1995 with Internet Explorer and Netscape Navigator 2.0, Notepad, a lot of browser refreshing, and stone knives and bearskins, he manages to keep a web site online that is standards-compliant but always in need of updating at http://www.nhaines.com/.

As a hybrid author who enjoys stiff drinks, moonlit walks on the beach, and five-star Amazon reviews on his books, he would love to hear from you at nathan@nhaines.com or nhaines@ubuntu.com.

About the Technical Reviewer

Jess Bermudes is a software developer who, like most college kids, experimented with wacky things, in this case Linux operating systems. After being introduced to Ubuntu in 2007 and quickly letting the power of root go to his head, he joined the Ubuntu California Local Community Team to help them show others the fun and power of computing with Free Software.

His interests span the entire field of computing, dabbling in areas such as robotics, game development, and computer-assisted learning. With this background he works as a freelance consultant developing custom software solutions at both the high and low levels of programming, building the systems needed to bootstrap startup companies.

In addition to his work with the Ubuntu California Team, he also volunteers with the Southern California Linux Expo helping the A/V team develop the systems required to record and stream the conference talks.

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So thanks to all of the teachers and staff at school and college that got me started in computer support and technical writing – too many to mention, although I'm sorely tempted. Their encouragement of my interest in computers and programming, and the opportunities they created set me down the path I'm on today.

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Finally, special thanks to Christopher B. Wright, who wrote the awesome book *Pay Me, Bug!*, released it under the Creative Commons Attribution-Noncommercial-Share Alike 3.0 (CC BY-NC-SA 3.0) License, and then gave me permission to use the cover and excerpt found in Figure 3-23.

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Introduction

Ubuntu is a lot of things: an operating system, a software ecosystem, a development platform, a home computer solution, a server foundation, a cloud computing paradigm, a stunning new phone, and a community. Ubuntu and its community of developers, contributors, and enthusiasts help to make Ubuntu a first-class experience no matter where you find it.

In this book, we're looking at Ubuntu as an amazing desktop operating system. I'll nod at other possibilities here and there, but this book will help you feel at home with Ubuntu and get things done, whether you want to create business documents, relax with music or a movie, play some games, or just look at pictures of cats on the Internet. And yes, you can even run phone and server applications, right on your everyday computer.

What makes Ubuntu so great?

Ubuntu works a lot differently than Windows or OS X traditionally has. It has evolved separately from these proprietary operating systems, and that makes it both exotic and unfamiliar at times. And while the general concepts of windows and launcher icons are the same, there are a lot of underlying assumptions that make Ubuntu a very different experience. The main difference is the way that the Ubuntu, Free Software, and Open Source communities all come together to form the operating system you think of as Ubuntu. These combined efforts make Ubuntu a powerful way to get work done.

Ubuntu Is Built From Many Pieces

The first thing to know is that Ubuntu is built around an operating system kernel called Linux. The kernel is the program that is responsible for coordinating all of a computer's hardware and software. It manages hardware driver support, schedules how applications run and cooperate together and communicate with hardware, and takes care of a lot of behind-the-scenes details that we don't generally worry about when it comes to using a computer.

The kernel itself doesn't do anything on its own. It lets other software run in a way that can be built around the operating system and not the specific hardware. This means that a lot of other software must be written to be used with the Linux kernel and distributed alongside that kernel in order to produce a working, controllable computer system.

There are a lot of working parts, and the first thing you'll usually hear about when you look online is the GNU project. The Free Software Foundation rewrote a lot of the Unix *userspace tools*, or the command-line utilities that one would use to work with Unix using a text interface. The goal was to provide utilities that could be freely used, examined, and distributed. When the Linux kernel was first published in 1991, the GNU userspace was quickly brought to Linux and together they made a freely distributable operating system that others could build on.

Because it takes a lot of software working together to create a working system, it is common to see references to a GNU/Linux operating system. I won't use that convention in this book but GNU tools are a major underpinning of most modern Linux-based systems, and we'll be using a lot of them in Chapter 5.

Since 1991, Linux has been bundled with other software and distributed in a way that makes it usable out of the box. Several projects began to form that distributed bundles in different ways, and these are now known as Linux distributions, or distros for short. The first distro to focus on creating a full computer system containing only Free Software was called Debian, and since 1993 it has gathered together a vast collection of freely redistributable software that runs on over 20 different computer architectures and can be further modified for use in other projects.

Free Software is a term of art that refers to software that can be used for any purpose, commercial or private, and can be freely examined, modified, and redistributed to others. This allowed Linux to receive improvements from others and incorporate them so that everyone could benefit from them. It also allowed a more and more useful collection of software to be included along with the new kernel.

Ubuntu Is Linux for Human Beings

In 2004, a Debian developer named Mark Shuttleworth decided that he wanted to take Debian and focus on releasing on a consistent time-based schedule that would offer fresh software but with special attention given to polishing the user experience and providing high-quality language translations as well. Linux distros tended to include massive amounts of software that you had to choose between during installation, and it often took three to five CDs worth of data to download before you could start an install. In the early 2000s, this was a lot of information to download. One of Ubuntu's initial goals was to fit on a single CD and provide a beautiful desktop with one web browser, one office suite, one e-mail client, and so on. By doing so, the install process was simple and streamlined but additional and alternative software choices were still only a few clicks away.

Another major goal was to build a community that embraced the African philosophy of *ubuntu*—humanity toward others. Thus, the Ubuntu Code of Conduct (`http://www.ubuntu.com/about/about-ubuntu/conduct`) set clear guidelines for how community members should treat each other. The idea that everyone should be treated with respect and newcomers should be welcomed and celebrated worked to create an online community that was much friendlier and respectful than a lot of other technical communities. It was such a successful example that Ubuntu spread very quickly and many technical communities have adopted their own codes of conduct.

As Ubuntu continued to mature, it further distinguished itself from its origins. While Ubuntu still depends greatly on the Linux kernel, the GNU userspace, the Debian distribution, and thousands of other software projects, it still brings these components together in a way that offers a stunning and unique desktop experience right out of the box. This collaboration also allows Ubuntu to provide security updates and bug fixes to all of the software it installs on your computer.

Ubuntu has been working to redefine the desktop experience, and the Unity desktop shell is a brilliant and bold new interface that dedicates almost your entire screen to your applications but keeps your favorite applications, indicators, and hybrid local and online searches at your fingertips. In addition, a single one-gigabyte DVD download results in a comprehensive, complete computing experience in only about four gigabytes of space once installed on your hard drive. From there you can add other software as you see fit.

By knowing some of the history of Ubuntu, we can see how it can be so different than other operating systems. But these differences are often strengths. Because Ubuntu is freely distributable, you can download and try it for free. And the install disc that you download can also be installed on a USB drive instead of a DVD, and you can even run Ubuntu directly from the disc and give it a try before you actually choose to install it. That means that the best way to learn more about Ubuntu is to dive in and just try it. But it also means that an Ubuntu disc can be used to test and recover data from computers that aren't working too well, even if they're not running Ubuntu.

A wide array of software that can be arranged to accomplish any task, dozens of supported languages, and a friendly, helpful community to turn to for support and exciting activities are just some of the things that make Ubuntu so great. The first chapter will help you get Ubuntu installed and up and running so that you can experience it for yourself.

Ubuntu 14.04 LTS is the latest long-term support release of Ubuntu. It provides a platform for a lot of different experiences and will continue to receive security updates until April 2019. For simplicity's sake, this book is going to assume that you are running Ubuntu 14.04 LTS installed on a computer hard drive, and Chapter 1 is going to help you set this up. But as you explore Ubuntu and become more comfortable with it, you may want to use your computer in a different manner than Ubuntu assumes. There are various flavors of Ubuntu that come preinstalled with different software selections. They are useful in a lot of different circumstances but are all variations of Ubuntu. You could install Ubuntu and by adding and removing software end up with the same configuration. The next chapter will describe some of these differences as well.

If you do not already have an Ubuntu DVD, visit the Ubuntu web site at http://www.ubuntu.com/ and download the Ubuntu Desktop installer. Every six months a new installer called a "point release" will be available that contains all updates to that point. At the time of publication, Ubuntu 14.04.3 LTS is the latest version.

Additional resources

No book can cover everything, and this book cheerfully doesn't try to. A lot of topics are covered in enough detail to get you started, but with Linux and Ubuntu you can always dig a little deeper. Apress has an amazing assortment of books on all topics and for all skill levels and is a great place to look for comprehensive guides. In addition, there is an incredible amount of resources provided by the Ubuntu community—persons just like you who are sharing what they've learned—and I encourage you to explore them and to contribute back. We all make up Ubuntu together.

- The **official Ubuntu documentation** on your computer is also available online, along with additional community-maintained help. https://help.ubuntu.com/
- **Ask Ubuntu** is a question-and-answer site where Ubuntu users can help each other. It's a great place to search for help and ask specific support questions. http://askubuntu.com/
- The **Ubuntu community portal** is a great place to find ways to contribute back to Ubuntu and to find resources that can assist you. http://community.ubuntu.com/
- Your **Ubuntu Local Community (LoCo) Team** is filled with friendly people who are crazy about Ubuntu, and they are happy to point you in the right direction if you want to meet other Ubuntu users or help share Ubuntu with others. You can find more about your local team and view upcoming Ubuntu events in your area at the Ubuntu LoCo portal. http://loco.ubuntu.com/
- Your local **Linux User Group** is filled with Linux enthusiasts, many of whom are familiar with Ubuntu. Search for them online and join them at their next meeting!
- The **Ubuntu subreddit** is a fun place for readers to highlight and discuss Ubuntu news and community matters. Read the rules in the sidebar, and if I remove your support question with a gentle reminder to use Ask Ubuntu, it's not personal! http://reddit.com/r/Ubuntu/

- **Planet Ubuntu** is an aggregate of various personal and project-related blogs that share Ubuntu news regarding announcements, development, events, parties, and other interesting topics gathered from Ubuntu member blogs. http://planet.ubuntu.com/
- **Ubuntu Insights** is Canonical's portal for news, partner announcements, industry white papers, and is a place to read about Ubuntu's place in the computing industry as a whole, as well as consumer products featuring Ubuntu. https://insights.ubuntu.com/

There's a great, big community out there, and we're all hoping that Ubuntu will help you be more productive, have more fun, and be happier. Don't hesitate to reach out if we can help! Just remember, you're a part of the Ubuntu community, too!

CHAPTER 1

Installing Ubuntu

All things considered, installing an operating system should really be difficult and arcane. It controls your computer. After starting everything up, it loads the drivers, runs every program, orchestrates how software and hardware work together, provides the computer user interface, and determines how you will work with your machine.

But it's not.

Those days are over. Long gone are the days when you'd have to feed the computer the Initial Program Loader from punch cards, paper tape, or magnetic tape. Flicking front-panel switches to input a bootstrap program is another forgotten ghost of computing history. Searching for driver disks to have on hand to support your new graphics or sound card mostly isn't necessary anymore. Even just watching the monitor so you know when to swap to the next installation floppy or CD is a distant memory. Today, you insert a DVD or USB drive with the installer, boot up the computer, and away you go. Installing a modern operating system is done using the same pretty, graphical interface as the end result.

Ubuntu is like Windows 10 and OS X in that the installation media contains a comprehensive set of drivers for most hardware devices found in a common home computer, and computers have enough storage space that the installer will set up a basic running system with a standard configuration. After everything's set up, you can make changes, but everyone gets the same starting point. This makes installation fast: a standard image can be installed to the hard drive. It also makes installation easy: other than language, region, time, and user information, once the installer knows where to install the OS, it doesn't need any information to start installing. And if you have an active network connection, it guesses at the region and time settings, too.

No, Ubuntu can be installed in 20–30 minutes, depending on how fast your disks are, and if you run the installer after clicking "Try Ubuntu" from the installation media, you can even browse the Web or play Solitaire or Mines while you wait.

There are a lot of ways to install Ubuntu, so this chapter will make some assumptions. The first is that you are using the latest long-term support release of Ubuntu, which is 14.04 LTS. The second is that you are installing Ubuntu from a DVD or a USB drive that was at least temporarily dedicated to holding the Ubuntu installer. These same assumptions will be made throughout the entire book. If you are new to Ubuntu, this will provide a stable, reliable starting point as you become familiar with Ubuntu.

This isn't the only way to experience Ubuntu. Newer versions such as Ubuntu 15.10 will have more up-to-date software and minor enhancements, but will require updating to Ubuntu 16.04 LTS no later than July 2016. Ubuntu 14.04 LTS is supported until April 2019. Ubuntu has quite a few flavors such as Kubuntu and Xubuntu, which keep the core Ubuntu system and replace the default interface and applications to offer a different experience. All of the applications described in this book will be available and run fine on any Ubuntu flavor, but much of Chapter 2 will no longer apply because these different interfaces have varying features and distinct workflows. There are ways to add additional desktop environments to an existing Ubuntu install and gain the benefits of a flavor, and this is explained in Chapter 6. But if you later find that you prefer a different flavor of Ubuntu, you can install it from scratch. This will give you a cleaner, simple base that's built around your favorite interface and you can still install any additional software you need.

This chapter guides you through the basics: preparing to install Ubuntu 14.04 LTS, performing the actual installation, and optionally switching to more advanced graphics drivers—in case you need them for gaming or additional monitor support. The remainder of the chapter will offer a brief look at additional Ubuntu flavors, giving you an idea of the differences you can expect with those interfaces during installation and daily use.

Preparing to Install Ubuntu

The first thing you'll need to do is to download and prepare installation media for Ubuntu. These are usually distributed as DVD images, but you can also prepare a USB drive as well. Installation DVDs are much easier to create than USB keys, and sometimes you will receive a copy of Ubuntu with a book, from a library, from a friend, or from a local Linux User Group or Ubuntu Local Community team. If you have any trouble with this chapter, these are very useful resources to search for. The following steps are geared toward Ubuntu, but generally apply to the other flavors of Ubuntu as well.

System Requirements

Ubuntu is available for both 32-bit and 64-bit computers, and you should install the 64-bit version if your computer will run it. You will also need a computer that has 3D graphics acceleration although most computers have this feature built in.

In order to install Ubuntu, you will need to have at least 6.5 GB of hard drive space available. That said, 20 GB is a more comfortable amount to allow for additional software and storage for your own content. You'll also be happiest with a computer that has at least 2 GB of RAM, although 1 GB should also be usable with 32-bit installs.

You can download the Ubuntu installer from `http://www.ubuntu.com/download/`. It will be in the form of a DVD image with an .iso file extension.

Creating an Ubuntu DVD

If you want to install Ubuntu from a DVD, insert a blank DVD into your computer. In Windows you can right-click on the downloaded file and choose the menu option that says "Burn disc image" to move the installer to a blank DVD. In Ubuntu, right-clicking the file and choosing "Write to Disc…" will accomplish the same thing. On either OS you will want to make sure to check the "verify" option before burning the DVD, to guard against disc burning errors.

On OS X, you can run Disk Utility, then drag the downloaded file to the left pane where your hard drives are listed. Click on the Ubuntu ISO and click on the Burn icon in the toolbar, and the installer will be moved to the blank DVD. Make sure to enable the option to verify the burned disc.

Once the disc is burned, you'll be ready to use it to start Ubuntu on your computer. Use a felt-tip pen to label the disc "Ubuntu 14.04.3 LTS," with an accurate point release number if you downloaded a later version, and add "32-bit" or "64-bit" as appropriate. With this DVD, you can run Ubuntu straight from the disc, which is a great way to demonstrate Ubuntu on a friend's computer without changing it, or to do basic computing on a computer that has malware or viruses installed or is having trouble booting up. This makes it much more useful than a simple install disc, so you may want to keep it in a safe place so you can use it or lend it to friends in the future.

Creating a Bootable Ubuntu USB Drive

Preparing a USB drive to install Ubuntu is a lot more complicated, but if you want to install Ubuntu from a USB drive, you will need a drive with at least 1 GB free, formatted with the FAT32 file system. The completed drive will be identical in functionality to an Ubuntu DVD, although some drives can be configured with "persistence," which means that settings changes and files will be saved to the USB drive for next time.

Windows

On Windows, you'll need to download a special utility to copy the installer to the USB drive. You can download the Universal USB Installer from http://www.pendrivelinux.com/. This site contains step-by-step instructions with screen shots that you can refer to, but the basic steps are to run the program, choose Ubuntu 14.04 LTS from the drop-down list, and select the ISO you would like to copy. If it's in the same directory as the utility there's a good chance it will be automatically selected it. Choose your USB drive's drive letter and click "Create." Be very careful to choose the right drive letter because if you choose your system disk, it can make your system disk unbootable.

OS X

On OS X, you will need to use the command line to convert the ISO file into a disk image, identify the internal device name, and copy the disk image over. This will destroy or make unrecoverable all data on the target disk, and it is easy to accidentally target the wrong disk, so consider burning a DVD instead and creating a USB drive using Ubuntu.

Once you download the Ubuntu ISO, go to Applications, then Utilities, and open Terminal. This will open a command-line interface where you can type commands directly to the computer. Type the commands exactly as indicated, including upper and lowercase letters. You should substitute the **bold text** to match your computer's settings.

The first thing you will need to do is to convert the ISO file to a disk image IMG file. To do this, you will type:

```
hdiutil convert -format UDRW -o ~/Downloads/ubuntu-14.04.3-desktop-amd64.img ~/Downloads/
ubuntu-14.04.3-desktop-amd64.iso
```

You may need to change the location or the filenames if you saved the ISO outside your Downloads folder or if you downloaded a 32-bit version of Ubuntu or a version other than 14.04.3 LTS. This step may take a long time. Once `hdiutil` is finished, the next step is to determine the device name of your USB drive. This is extremely important. First, you'll run `diskutil` to list all attached drives:

```
diskutil list
```

Then, connect your USB drive to your Mac and run the same command again. You'll see an extra disk listed, and that will be the name of your target disk, in the format **/dev/disk2**. The actual name depends on what drives are connected and the order of connection since the computer was started, so you'll need to repeat this step again each time you create a USB drive with Ubuntu. Next, you want to unmount the USB drive so that OS X doesn't try to use it while you're copying the disk image you created. Run the next two commands, substituting the IMG file you created above and the drive name you found with `diskutil`.

```
diskutil umountDisk /dev/diskX
sudo dd if=~downloads/ubuntu-14.04.3-desktop-amd64.img of=/dev/diskX bs=1m
diskutil eject /dev/diskX
```

■ **Tip** Replacing “disk” with “rdisk” in the command above can greatly increase the speed of the command because of the way the disk is accessed. But if you’re only making one USB drive, I’m a big fan of “slow and steady.”

The `sudo dd` command will take several minutes to complete, because it copies the disk image directly to the USB drive. Once all of the commands finish, you have a USB drive that can be used to run or install Ubuntu.

Ubuntu

On Ubuntu, even if you are running it from a DVD or USB drive, open the Unity dash and search for “Startup Disk Creator.” Chose an inserted disc or ISO and then select a USB drive from the list, and click “Make Startup Disk” to create a bootable USB drive. Any inserted disc or ISO located in the Downloads folder will be listed automatically. If the “Make Startup Disk” option is grayed out, you may need to use a different USB drive or delete some files to clear enough space.

Due to a change in the disk images, Ubuntu 14.04 LTS discs or ISOs should only be created while running Ubuntu 12.04 LTS through Ubuntu 14.04 LTS, and discs or images for Ubuntu 14.10 and later should be created from Ubuntu 14.10 or later.

Booting into Ubuntu

Every computer’s startup process is different. It is determined by the computer manufacturer, but more specifically by the motherboard manufacturer. When a computer turns on, it runs special software that’s built into the motherboard. Traditionally this was called the BIOS, but most computers built today use UEFI.

On any Mac, insert the disc or USB drive, turn on the power, and hold down the Option key until you see a list of drives. Choose your Ubuntu media with the mouse or arrow keys, and continue booting.

On other computers, you will need to configure the BIOS or UEFI to boot from your disc or USB drive. There is no standard way of doing this, so you may need to consult your manufacturer’s documentation for instructions. First, insert the disc or USB drive into your computer, then turn it on. You can usually watch the startup screen for messages such as “Press <ESC> for startup menu,” “F9 to change boot device,” “F12 Boot Menu,” or something similar. These will let you choose a device to boot from for the current boot only. You only have a couple of seconds to press the key, so plan to let the computer boot at least twice for you to be able to locate and read the message. If your installed OS begins to boot, let it finish before restarting the computer, then use the OS’s shutdown feature. If your computer has no OS, then you can simply reboot at any time.

The other option you have is to change the boot search order in your BIOS or UEFI configuration. This will change your settings until they you change them again, and may be the only way to choose a different boot device. For this you want to search your startup screen for messages like “DEL to enter BIOS” or “F10 to enter setup.” You should be able to find a boot options or advanced menu with a boot order option. You’ll want to move your boot device type to the top or front. Sometimes USB drives are only listed if they are plugged in when the computer turns on. Once you have changed the startup order, follow the onscreen instructions to save your changes and boot or exit the configuration.

When your computer reboots, you will know that you were successful if you see a solid color screen with a simple icon at the bottom, as shown in Figure 1-1.

Figure 1-1. *This is the Ubuntu bootloader screen. It means your computer has booted from your installation media*

The icon means that pressing any key on the keyboard will allow you to set up various accessibility options. If no keys are pressed for five seconds, the bootloader starts Ubuntu in English and will ask whether you want to install Ubuntu or just try it out. If you already know whether you want to install Ubuntu or try it without installing, pressing the spacebar can speed the final startup process.

Pressing the spacebar (or any other key) will prompt you for a default language for your Ubuntu experience and then allow you to choose other accessibility and startup options (see Figure 1-2). F5 can be used to activate high-contrast themes or a screen reader.

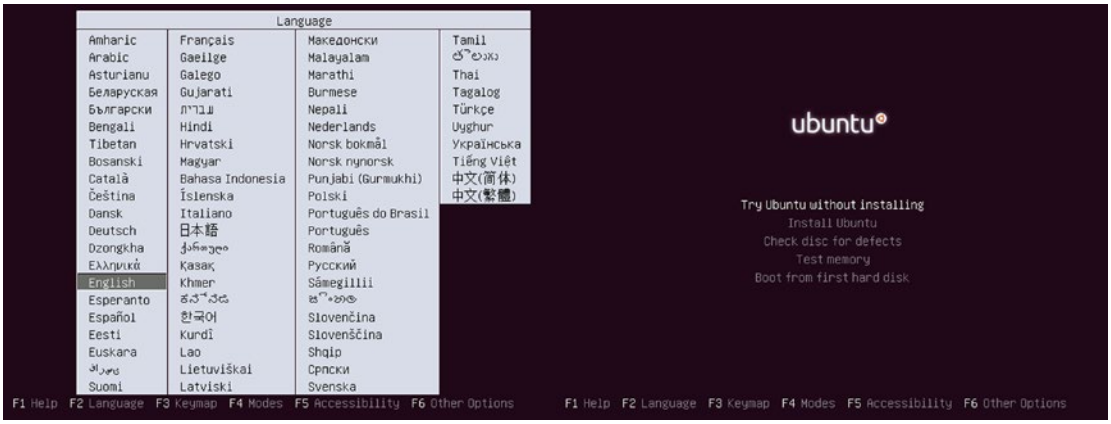

Figure 1-2. *From the bootloader you can choose your language and other startup options*

You can also use this menu to verify your installation media or test the computer's RAM for errors. Both are useful troubleshooting tools if anything goes wrong during installation. The last option is useful if you changed your boot settings and accidentally booted from the Ubuntu installer instead of your computer's hard drive. It should hand control back over to your installed operating system without booting the Ubuntu installer.