

## 3.2.1 Linux Installation

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Click one of the buttons to take you to that part of the video.

Linux Installation 0:00-0:48

In this lesson, we're going to review the process that you need to go through in order to install a new Linux system. Understand that the process we're going to provide you here is composed of mostly just high-level steps. That's because the actual steps you'll need to perform will vary from distribution to distribution. Really, the installers used by all the various Linux distributions are each slightly different. The order in which you complete these steps are going to differ. However, most distributions will require you to complete the steps we're going to talk about here.

Most Linux distributions will provide you with several different options for installing a new system. These options usually include, first of all, installing locally from an optical disk, installing locally from a USB drive, or installing remotely from a network server.

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Installing from an Optical Disc 0:49-1:23

One of the more common methods for installing Linux is to install locally using an installation optical disk. Using this method, you simply insert your disk into the optical drive of your system, and you boot the system from the disk, which means you're going to have to access your system BIOS or UEFI configuration settings and specify that the system boot off the optical disk first, not the hard disk drive. When you do, the installer loads from the optical disk, and the files needed to install the Linux system are copied over to your system hard drive.

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Downloading an ISO Image 1:24-4:26

For most Linux distributions, you can download a copy of their installation disk image from the vendor's website. For example, if we wanted to install OpenSUSE, we could open up a web browser, go to [openSUSE.org](https://openSUSE.org), and see a screen similar to that which is shown here. We want to select the download link after we specify whether we are installing on 64-bit hardware, or we have an old 32-bit system, which is very unlikely. Click on Download DVD, and then an ISO image is downloaded to your workstation.

An ISO image is, essentially, an image of an optical disk. Therefore, once you've downloaded your ISO file, you can use optical disk burning software on your system to burn the ISO image to a physical disk, which basically means you've got to have another system available in order to download the image, burn the disk, and then install it on another system.

Be aware that after you download an ISO file from the internet, it's a really good idea to verify its MD5 checksum value. This is done to make sure that it arrived intact without any corruption. Here's what you need to do. After downloading the file, run an MD5 checksum on the ISO file that you downloaded. That will result in a particular MD5 value. What you want to do is compare the value that you calculated using the MD5 locally with the MD5 value reported on the distribution's website, where you downloaded your ISO image from.

If the checksum that you ran locally is exactly the same as the checksum reported on the website where you got your ISO image from, then you know that that ISO image arrived intact. It wasn't tampered with in transit, nor was it corrupted in transit. However, if these checksum values do not match, then you know that the ISO file we have downloaded and are storing locally is not identical to the ISO file on the website. This is almost never a good thing. In fact, I can guarantee you that this is almost always a bad thing. It means either the file did not make it correctly, some type of network glitch caused some corruption in the file, or somebody intercepted the file in transit and tampered with it in some way.

If your checksums match, you know the ISO image is good and you can burn that ISO image to an optical disk, boot the system from the optical disk, and then run through the Linux installation. Now, I do need to point out at this point that if you are going to install Linux onto a virtual machine running on a hypervisor instead of on a physical piece of hardware, you can skip that step. You don't actually have to burn the ISO image to disk.

Instead, what you can do is configure your virtual machine to connect directly to the ISO image itself. The virtual machine will think that that image file is a real DVD. It'll just run the install from it. This is very beneficial because installing Linux using this method is actually a lot faster because the data is actually stored on a hard disk drive instead of an optical disk. The access speed on a hard disk is much faster than that of an optical disk.

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Installing from a USB Drive 4:27-6:15

If you are going to install Linux on a piece of physical hardware, then you are going to have to burn your ISO image to disk. Alternatively, you could also burn your ISO image to a USB thumb drive, and then boot your system off of it. Installing Linux in this manner is also much faster than installing from an optical disk. That's because USB flash drives have a much faster access speed than an optical drive does. In order to do this, you need to have a Linux system already running somewhere so that you can move, essentially, the image from the image file onto your USB drive. The process for doing that is shown here.

First step: Back up anything on that USB drive that you don't want to lose. This process is going to completely wipe your USB drive, and if you do it and lose files, don't complain, because I told you not to do this.

Second step: Connect the USB drive to your system, and then try to figure out which device file it represents. If you have one hard drive in the system, then, most likely, your USB drive will be `/dev/sdb`.

Then, switch to your user account and run the command that you see here: `'dd if=[filename.iso] of=/dev/[sdb]'`. The I F part of the command stands for input file, the O F command stands for output file. Essentially, what we're doing with this command is taking the optical disk image, extracting it from the ISO file, and we're writing it directly to the USB drive. It'll take a few minutes to complete.

When it's done, take that USB drive and connect it to the system that you're going to install, and then configure that system to boot off of the USB drive. When you do, you'll be able to run through the install from the USB.

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### Installing from a Server 6:16-9:54

Another cool option for installing a Linux system is to install it from a network server. You can set up a Linux server on your network somewhere and configure it as an installation source to install other Linux systems. You can do that using several different network protocols. You can do it using the SMB protocol, the NFS protocol, the HTTP protocol, or the FTP protocol. In fact, if you wanted to, you could even install your Linux system directly from an FTP or HTTP server on the internet.

Understand that not all Linux distributions will support a network-based installation, but most of them do. The key advantage of installing Linux in this manner is the fact that you can install a large number of systems all at once. Think about it; if you had 20 systems that you needed to install and you were using the optical disk method or the USB drive method, then you'd have to create a disk or USB drive for every single system (if you wanted to install them all at once).

If you only wanted to create one DVD or one USB drive, then you'd have to install those 20 systems serially. Install the first system. Wait until it's done. Install the second system. Wait until it's done. Install the third system. Wait until it's done. Either way, it's going to take a long time.

Using a network installation, we can actually connect lots of computers all at the same time to the same server, access the same set of installation files, and run all of our installs concurrently. There is a disadvantage to doing it this way, and that is the fact that a network installation is typically slower than installing off of a DVD or a USB drive. If you're installing from a local network server, it's not quite that bad. If you're installing over the internet, it is really slow.

Before you can run a Linux installation over the network, there are several preparatory steps that you have to complete. Honestly, if you're going to be doing this to install one system, it's probably not worth all the extra work it takes to get your installation server set up and running. This process is most appropriate, as I said earlier, for situations where you need to install lots of systems all at the same time.

The first step is to copy the Linux installation files over to a directory on your installation server. Basically, those files need to be available in the file system on the server, where network clients can access them.

Then, you need to pick which protocol you want to use to access the files. We listed those previously. For example, if you want to use the SMB protocol to access these installation files, then you need to install and configure the Samba service on the server, and then you have to share the directory using SMB where the installation files reside. That's step number three.

At this point, the installation source server's set up. So the next thing you need to do is go to your distribution vendor's website and download a network installation disk image. These are usually CD images instead of DVD, because they only contain a very minimal set of files. Just enough to get the Linux installer up and running and connect over the network to a different host, where the installation files actually reside.

You need to burn this image to disk and then boot the system from it.

Once that's done, at the first installation screen, you need to specify where your installation source is. You'll have to specify the protocol to use, such as SMB, or HTTP, or FTP, or NFS--whatever it is you've configured--and also specify the address of the installation server. At that point, you start the installation, and it will proceed using the installation files from the remote server.

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### Installing Linux 9:55-11:29

At this point, we're ready to actually install Linux. It doesn't matter whether you're installing off the network server, from an optical disk, or from a USB drive. You typically specify the various installation parameters shown here. The way this will be done will vary from distribution to distribution, and they may be done in a different order. Some steps might be done automatically for you; others might require more details. You'll just have to check the documentation for the specific distribution that you're installing.

However, most distributions will require you to configure the same things, such as our locale settings: what's our time zone? What keyboard language do we want to use?

We'll also have to specify how we're going to partition our hard disk drives and what file systems we're going to use on those partitions. We'll also have to specify which bootloader we want to use and how we want our boot menu to be configured. We will also probably have to specify which packages we want installed during the installation process. We will also be prompted to write a password for the root user account, and most distributions will also require you to create at least one standard user account during the installation process and assign a password to it.

This is done for security reasons. Basically, you should use your standard user account to perform your day-to-day work. You should only switch to your root user account when you need root-level privileges to perform root-level tasks. As soon as you're done with those tasks, you exit out and go back to your standard user account--it protects the system.

You'll also probably be prompted to configure your network settings. You may also be prompted to configure your hardware settings as well, although I see that less and less in modern Linux distributions.

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Summary 11:30-11:54

In summary, that's the process that you need to follow in order to install a new Linux system.

In this lesson, we first talked about selecting your installation source. We talked about using optical disks, USB drives, and network servers.

We ended this lesson by reviewing the process that you're going to have to follow in order to install the Linux system, and we emphasized the fact that the actual real process that you're going to use will depend upon which distribution you choose to install.

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