

### 3.2.3 Linux Installation Facts

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This lesson covers the following topics:

- Obtaining installation software
- Selecting and preparing an installation method
- Installing Linux

## Obtaining Installation Software

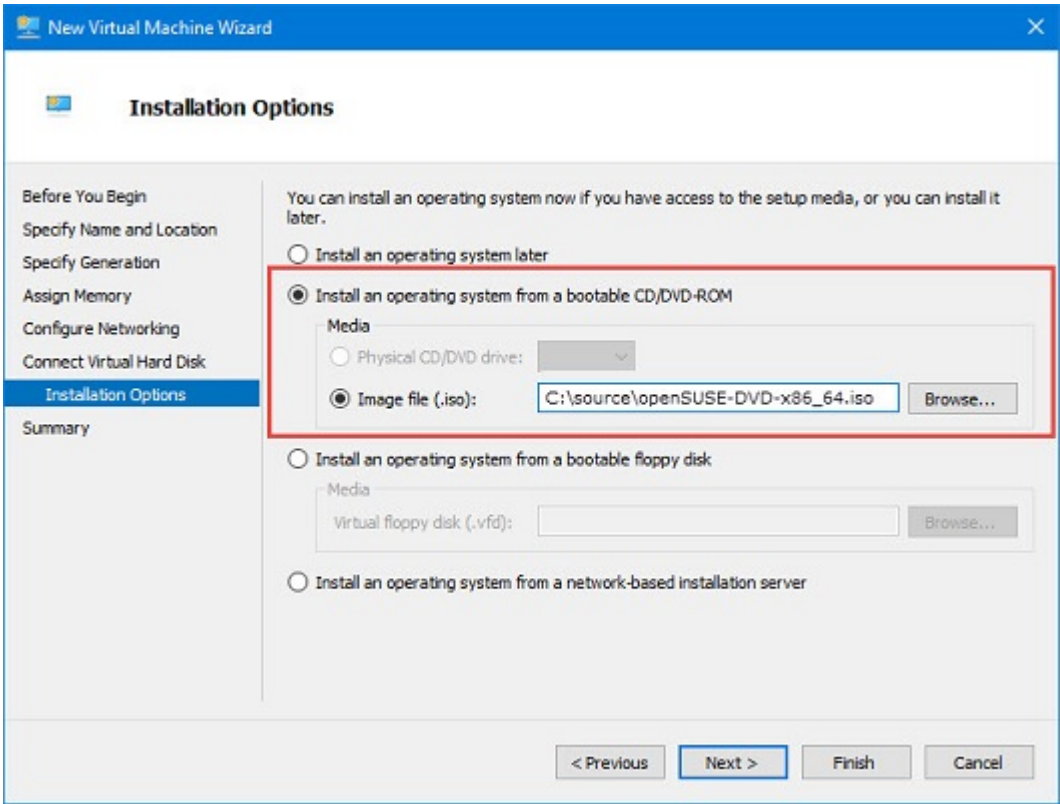
A Linux distribution (also known as a distro) is a unique compilation of the Linux kernel, utilities, desktop environments, applications, and more. To install Linux, you must research and determine which distribution you will use. After this decision has been made, you will go to the vendor's website and obtain the installation media required. Some vendors may allow you to order an optical installation disc. However, in most cases, you will simply download the installation media in the form of an ISO file.

## Selecting and Preparing an Installation Method

The following table describes Linux installation methods.

Installation Method	Description
ISO image	<p>A Linux ISO installation image is a file containing an exact copy of a Linux optical (CD/DVD) installation disc. An ISO image can be mounted (made available to a computer) and used to install Linux. It can also be burned to an optical disc, from which the installation can be performed.</p> <p><b>ISOs and Virtual machines</b></p> <p>One common use of an ISO is to configure your virtual machine to connect directly to the ISO image. Once this step has been completed, the virtual machine thinks that the ISO image file is a real CD/DVD.</p>

This image is an example of using an ISO image with Hyper-V:



Optical disc

If the destination machine contains an optical disc (CD/DVD) reader, you can install Linux by booting from a disc containing the desired Linux distribution. In most cases, you will download the desired distribution from the internet in the form of an ISO image and then burn that image to an optical disc.

USB drive

Similar to the optical disc method, a Linux installation ISO can be transferred to a USB drive (flash or hard drive). The destination machine can then be booted from the USB drive, from which Linux can be installed.

Configure a USB drive with the Linux distribution image from an existing Linux machine as follows:

1. Connect the USB drive to your Linux system and then determine which Linux device file represents the USB drive (such as `/dev/sdb`).
2. Switch to your root account (or use **sudo**) and run the following command:



**`dd if=filename.iso of=/dev/sdb`** or **`sudo dd if=filename.iso of=/dev/sdb`**

`dd` is the convert and copy a file command. With this command, you are extracting and writing the ISO file to the USB drive.

In the above command, `i f` stands for input file (the source file), while `o f` stands for the output file (the destination). `Filename.iso` is the name and location of the ISO distribution file downloaded, while `/dev/sdb` is the Linux device file being used by the USB device.



This command was original named `cc`, but was renamed `dd` because `cc` was already in use for the C compiler.

<p>Network installation</p>	<p>With this method, the Linux distribution is placed on a network server, from which the installation can be performed. Using this method, multiple installations can be performed at the same time. Common protocols used to perform the installation include SMB, NFS, HTTP, and FTP. Make network preparations as follows:</p> <ol style="list-style-type: none"> <li>1. Copy the Linux installation files to a directory on your installation server. These files need to be available in a file system accessible to the desired clients.</li> <li>2. Share the installation directory.</li> <li>3. Select, install, and configure the installation protocol that will be used to access the files. For example, to use SMB, you must install and configure SAMBA.</li> </ol> <div data-bbox="428 548 1485 688">  Not all distributions support a network installation. Before proceeding, verify that this is a viable option. </div> <p>Make client preparations as follows:</p> <ol style="list-style-type: none"> <li>1. Download a network installation image (usually an ISO CD/DVD image). This image will be used to boot the destination computer, giving it the means by which it can access the source server previously prepared. This is not the Linux distribution installation software.</li> <li>2. Burn the image obtained in step 1 to the desired media (CD/DVD/USB).</li> </ol> <div data-bbox="428 1018 1485 1276">  As an alternative, you can configure the destination and source machines to use PXE ( the Preboot eXecution Environment). Using PXE, the destination computer can download the software required to gain access to the server containing the Linux distribution installation software. Configuring PXE is beyond the scope of this lesson. </div> <ol style="list-style-type: none"> <li>3. Boot the destination machine from the network installation image (or PXE if being used).</li> <li>4. After completing step 3, and at the first installation screen, you'll need to specify the installation source. You will also need to specify the protocol (such as SMB, or HTTP, or FTP, or NFS) being used for the installation.</li> </ol>
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## Installing Linux

The actual steps for installing Linux vary from distribution to distribution. Therefore, the following table describes only the general steps typically seen when installing a Linux operating system. You should also be aware that some of the steps can be completed in a different order than described below. For example, with some installations, you can either configure the installation destination and then the date and time or vice versa.

Step	Description
Start the installation	<p>In many cases, this step involves booting the computer from installation media (CD/DVD/USB/PXE). When using one of these media types, the BIOS may need to be configured to allow the computer to boot from the desired media before it tries to boot from the hard disk.</p> <p>Some Linux installers offer several installation options:</p> <ul style="list-style-type: none"> <li>• New install</li> <li>• Reinstall</li> <li>• Upgrade</li> <li>• Installation recovery</li> <li>• Reduced feature installation</li> </ul>
Select a language	The selected language becomes the default language for all users. This can be changed later.
Keyboard layout	<p>The keyboards used in different countries will often have different keyboard layouts. As a simple example, the @ key and the " key are swapped with the US and the UK keyboards.</p> <p>Some installation provide a method for automatically identifying the keyboard being used by prompting you to press specific keys.</p>
Set the system time	<p>The system time can be set to local time or Coordinated Universal Time (UTC) time.</p> <ul style="list-style-type: none"> <li>• For networks dispersed over multiple time zones, choosing UTC simplifies administration tasks.</li> <li>• Some distributions have options to synchronize the time over the network.</li> </ul>
Format partitions	<p>A partition is a logical division of a storage device associated with a hard disk drive. Create the partition structure according to the specifications in the installation plan. Determine the directory structure and file system type for each partition. This may require initializing a hard drive. Partitioning options include the following:</p> <ul style="list-style-type: none"> <li>• Use the entire disk (makes a single partition from the entire disk drive)</li> <li>• Use the entire disk and set up LVM</li> <li>• Manual (lets you manually create partitions according to the specific needs of the system or administrator)</li> <li>• Replace existing Linux systems (re-partitions all the previously installed Linux Operating systems)</li> <li>• Shrink partitions (reduces the size of an existing partition making room for additional partitions)</li> <li>• Use free space (creates a partition from unpartitioned space on the disk drive)</li> </ul> <p>Keep the following in mind when creating partitions:</p> <ul style="list-style-type: none"> <li>• Initializing a hard drive removes all existing data.</li> <li>• A swap partition is required for virtual memory. Swap partitions should be between one to two times larger than the computer's installed memory.</li> <li>• Linux computers can only have four partitions; however, a single extended partition can be sub-divided into additional partitions.</li> </ul>

	<ul style="list-style-type: none"> <li>• Create separate partitions for the following directories to keep logs or abnormally large user files from taking all disk space and to make recovery of data easier should the operating system crash.             <ul style="list-style-type: none"> <li>◦ /home (user directories)</li> <li>◦ /opt (installed software)</li> <li>◦ /var (log files)</li> </ul> </li> </ul> <p>The operating system can be reinstalled on the root partition (/), and the others can then be remounted with no loss to data.</p>
Select applications and services	<p>Installing applications and services depends on the role of the system. Applications and services include the following:</p> <ul style="list-style-type: none"> <li>• The boot loader determines which operating system boots by default (if more than one operating system exists on a computer).</li> <li>• Package patterns include packages necessary for a specific computer role (such as graphical desktop or web server).</li> <li>• Package repositories are locations on the internet, where software packages are maintained. Specific Linux utilities search and install software automatically from these package repositories.</li> </ul>
Set the root password	<p>The secure password for the root user (and any other user) should have the following characteristics:</p> <ul style="list-style-type: none"> <li>• At least eight characters long (longer passwords are harder to crack)</li> <li>• Use a combination of letters, numbers, and symbols</li> <li>• Should not include a username or a dictionary word (or common variations)</li> </ul>
Specify a host name	The name of the computer identifies the computer on a network. A domain may be required.
Configure network connections	Configure the network connections. This can include such things as the interface card, proxy servers, and how the network will obtain its IP address (manually vs. DHCP).
Configure services	Some services must be configured based on the role of the system (for example, a web server).
Add new users and groups	<p>Create user accounts and groups for the users who will use the computer.</p> <ul style="list-style-type: none"> <li>• Installations usually require at least one standard user account. A system user or the root user is often created automatically.</li> <li>• Network login options enable the system to access a server for login information rather than maintaining local authentication information.</li> </ul>
Configure the hardware settings	Hardware configuration settings might require appropriate drivers or language settings.

Identify  
remote  
access  
needs

Depending on your job role, you may need to manage Linux systems that don't have external peripherals connected, including monitors, keyboards, or mice. This is a common configuration for both Linux servers and virtualized Linux systems that run on a hypervisor. To manage these types of systems, you must access them remotely from another device. There are several options available to accomplish this:

- If the system has a management interface integrated within its hardware, you can use it to access the system display from a web browser and perform management tasks. This type of hardware is typically found only on high-end server systems.
- If the system does not have an integrated management interface, you can use two network protocols to remotely access it.
  - Use SSH to securely access the shell prompt of the system and run commands as if you were sitting in front of the system. You can also tunnel X server traffic through the SSH connection, which allows you to securely access the graphical desktop of the system.
  - You can use Virtual Network Computing (VNC) to remotely access the graphical desktop of the system.

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