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Tutorial7: Installing Linux / Live Linux / Virtualization

Contents [hide]

INSTALLING LINUX / LIVE LINUX / VIRTUALIZATION [edit]

Main Objectives of this Practice Tutorial [edit]

- Download and install the **VirtualBox** VM software application
- Download and run the **Knoppix Live VirtualBox file** in a virtual machine
- Open a terminal and connect to your Matrix account via the **ssh** utility
- Run several **open-source applications** in your graphical Knoppix Linux environment
- Understand the **limitation** of running Knoppix Live as opposed to a **persistent** Knoppix installation

Tutorial Reference Material [edit]

Course Notes	Concepts		YouTube Videos
Course Notes: • PDF | PPTX	Installing Linux • Linux Installation Choices • Live Linux	Knoppix Resources • Knoppix Website • Download Knoppix VirtualBox VM	Instructional Videos: • Install Knoppix as a Virtual Machine

Definition

* Virtualization
Definition

KEY CONCEPTS [edit]

Installing Linux [edit]

Having a Linux system on your home computer provides **access** to a large selection of **open source software**.

Installing your own version of Linux on your notebook or desktop computer also can make it easier to practice working
in the Linux environment and **learn** how to perform routine **Linux OS administration tasks**.

*A **Linux distribution** (often abbreviated as distro) is an operating system made from a software collection that is based upon the Linux*

Listing of Common Linux Distributions.
(Image licensed under cc   )

kernel and, often, a package management system. Linux users usually obtain their operating system by downloading one of the Linux distributions, which are available for a wide variety of systems...

Reference: https://en.wikipedia.org/wiki/Linux_distribution

Steps in the Linux Installation Process:

* **Select** a *Linux Distribution* to **download** (ISO image file or VM file).
* **Create** VM and **install** Linux Distribution or **run** VM file.

Linux Installation Methods [edit]

Standalone Installation

Linux is the <u>only</u> OS on the computer.
Any existing data on your hard disk will be **erased**.

Linux is the only OS on the computer
(Image licensed under cc)
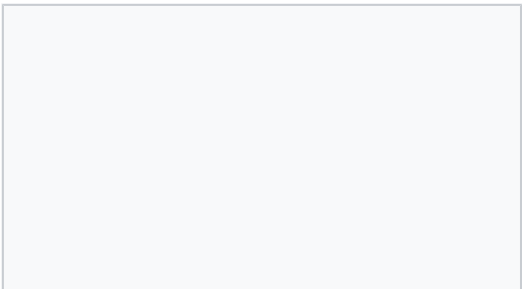
Dual-boot / Multi-boot Installation

A **boot menu** allows the user to select the desired OS.

Advantages of Dual-Boot or Multi-Boot:

1. This option provides a method to access your computer if one OS **fails to boot-up**.
2. **Access the Windows partition** if your Windows OS cannot boot-up.
3. This booting method is great for **troubleshooting**
   (*for example:* boot into Linux OS to eliminate a hardware issue).

The **grub boot menu** to select different operating systems upon computer startup.
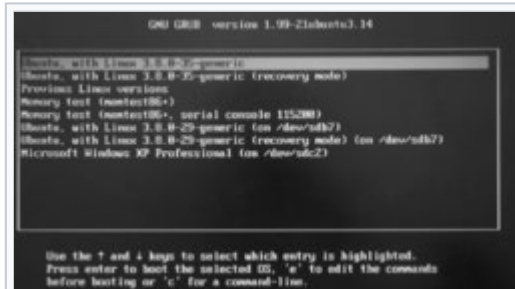(Image licensed under cc)

Installation Tips:

1. It is recommended to **back up important data** before proceeding.
2. It is recommended to **install the Linux OS** last, as other operating systems may not offer a multi-boot option.
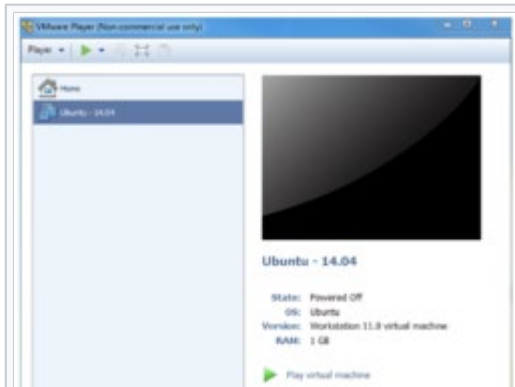
Virtual Machine Installation

Virtualization is the process of running a virtual instance of a computer system in a layer abstracted from the actual hardware. Reference:

VMware Player launch menu for Ubuntu Linux OS
(Image licensed under cc)

https://opensource.com/resources/virtualization

The virtualized OS is installed and run in a window under another OS. Special software is used to manage the entire process, referred to as the **hypervisor**.

Advantages of Virtualization:

1. You can run VM from an **ISO image file** or a **VM file**.
2. One or more virtual machines can be run at the same time.

3. The **guest** OS **shares hardware** with the **host** OS and possibly other virtualized systems.
4. The **guest** systems have **network access** through the host.

Installation Tips:

1. Virtualization requires a **compatible processor**: not all processors support that feature.
2. Your **BIOS** should be set to **enable Virtualization**.
3. Popular VM software for **Windows**, **Apple** and **Linux** OS include:
   - VMware
   - Oracle Virtual Box

Live Linux CD   [edit]

A live CD (also live DVD, live disc, or live operating system) is a complete bootable computer installation including operating system which runs directly from a CD-ROM or similar storage device into a computer's memory, rather than loading from a hard disk drive. A Live CD allows users to run an operating system for any purpose without installing it or making any changes to the computer's configuration.

Reference: https://en.wikipedia.org/wiki/Live_CD

The **Knoppix Live CD** is available to run on workstations at Seneca College via **AppsAnywhere**
or you can download and run it on your home computer as a Virtual Machine
(requires **VirtualBox** VM software installed on your computer).
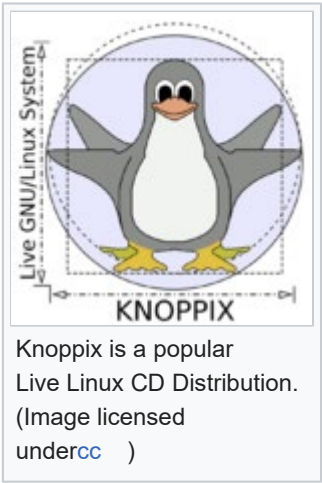
Knoppix is a popular Live Linux CD Distribution. (Image licensed under cc   )

INVESTIGATION 1: BOOTING KNOPPIX (LIVE LINUX) VIA VIRTUALBOX   [edit]

ATTENTION: This tutorial relates to an interest topic and is NOT worth marks.

In this investigation, you will first *download* and *install* the **VirtualBox** VM application on your home computer,
then you will then *download* and unzip the **Knoppix Live Distribution VM** file to your computer.

You will then *launch* the VirtualBox application by double-clicking the downloaded VirtualBox VM.
Once you launch the Knoppix Linux distribution, you will learn in **INVESTIGATION 2** to

perform
a few basic operations in the **Knoppix** Linux *graphical* Linux environment.

Perform the Following Steps:

ATTENTION: If you receive an error message indicating that your computer is NOT
set to handle **virtualization**, you need to <u>enable</u> virtualization in your notebook's **BIOS**.

Download page for **VirtualBox** VM application.

1. **Click** the following link to access the **Oracle Virtualbox** application download website:

   https://www.virtualbox.org/wiki/Downloads

2. In this website, **click** the link corresponding to your **computer's operating system** to download to your computer.

3. **Install** the downloaded **Virtualbox** VM application on your computer.

   NOTE: You may be required to allow **authorization** to run this program, select to install devices (if prompted) and to **restart** your computer after installation.

4. **Click** the following link to download the **zipped** (*compressed*) Knoppix Live Distribution
   file to your computer: Knoppix Virtualbox VM

   NOTE: This file is approximately **5GB** in size and might take a while to download.

5. Open a **File Manager** application and **navigate** to directory that the **Knoppix.zip** file was downloaded (eg. **Downloads**).

6. **Unzip** the downloaded zip file (In MS Windows: *Right click* and Select "*Extract All*")

   NOTE: The contents of this zipped file should appear in another file manager window.

Knoppix VM file contained in the zipped file.
Double-click Knoppix.vbox file to launch the **Knoppix Live Linux** Distribution.

7. Navigate to the folder containing the *extracted zipped files* and **double-click** the file called **Knoppix.vbox** to launch the Knoppix VM.
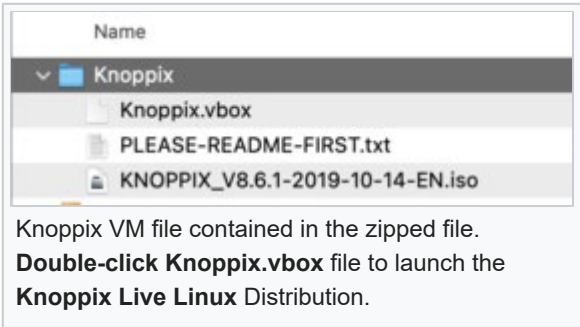
NOTE: By **double-clicking** on this file (even if the VirtualBox application is not running)
it will launch the VirtualBox application and start the Knoppix virtual machine.

For Mac Users: If you experience an error message regarding the Kernel extension, click on **System Preferences**, select **Security and Privacy**
and click to **allow Oracle** service extensions to run on your machine.

If you have difficulty running Knoppix on your home machine/laptop you may ask your
Learning Centre ULG leaders for additional help in troubleshooting why Knoppix is not working on your home machine/laptop.

8. If
   you
   are

Knoppix Start button
(icon on the **left**).

The **Knoppix Linux desktop environment** has a similar look as the MS Windows desktop environment. (Image licensed under cc)

using MS Windows, look in the taskbar below to see if the Virtual Box application is running click to display that application window.

9. Click on the Start button (looks like a green arrow pointing to the right).

10. If prompted, **click Scale** or **Switch** to scale mode to proceed.

11. If using *MS Windows*, click the mouse on the Knoppix screen and press **ENTER** to login.

12. Allow **time** for the Knoppix Linux distribution to start. This is a **graphical Linux distribution** which will start-up in a desktop environment.

    NOTE: You are **NOT** prompted for a *username* and *password* because this is a Linux Live distribution and you have been assigned a **generic account**.

    NOTE: If you are using MS Windows, press the **RIGHT CTRL** key to change to other applications by pressing **ALT-TAB**.
    When you want to use Graphical Linux (i.e. Knoppix screen), click in the screen to focus and use that screen.

13. **Click** the **Knoppix Start button** (refer to <u>left</u> icon in diagram on right). In the **Knoppix menu**, select **System Tools**

14. In the **system tools** menu, and select **Konsole** to launch a terminal application.

    FYI: To **increase** font size, press **ctrl+** to **reduce** font size, press **ctrl-**.
    You can drag the Konsole terminal window from the bottom-right corner
    to increase the window size.
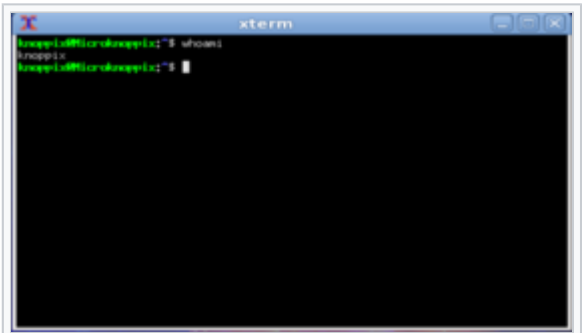
The **Konsole** application will display the Bash shell to issue Linux commands.

15. In the bash shell, issue the following Linux command: **`whoami`**

    What is the name of your generic Knoppix Linux Live account?
    On your Knoppix live OS, there is a **generic** user called **"knoppix"** that can be accessed <u>without</u> a password. This account has its own home directory.

    Let's test this out by using the ssh command to connect to your Matrix account. Your Knoppix virtual machine uses your host computer's operating system which is already connected to **Seneca's GlobalProtect VPN**.

16. Issue the following Linux command to connect to your Matrix account:
    `ssh yourSenecaId@matrix.senecacollege.ca`

17. Enter **yes** to share your *public key*.

18. When prompted, enter your **password** (remember that password does not "echo-back").

    Were you able to connect to your Matrix account?

19. Confirm that you are in <u>your</u> **home** directory on your Matrix account.

20. Use a **text editor** (*nano* or *vi*) to create a file in your current directory called **myvm.txt**
    and enter the following text displayed below. Make certain there are ONLY 3 lines:

    ```
    This is line 1
    This is line 2
    This is line 3
    ```

21. **Save** editing changes and **exit** the text editor.

22. Confirm that you created this file and confirm that the contents of this file are correct.

    Let's run a **shell script** to check that you created the **myvm.txt** file (with correct file contents) in your home directory.

23. Enter the following command: **~uli101/week7-check-1**

24. If you encounter errors, make corrections and then re-run the checking script until you receive
    a congratulations message, and proceed to the next step.

25. Issue the following Linux command to **terminate** your Matrix session: **exit**

26. Remain in the **Konsole** *terminal window* when performing **INVESTIGATION 2**.

   In the next investigation, you will learn to work in a graphical Linux environment.
   You will also run several open-source application within the Knoppix graphical
   environment.

INVESTIGATION 2: USING THE GRAPHICAL KNOPPIX VM [edit]

Let's learn to run *open-source* applications on your graphical Knoppix Linux Live distribution. But first, let's **download** and run a **shell script** that will display **dialog boxes** in your graphical Knoppix VM.

Perform the Following Steps:

1. Make certain that you are running your Knoppix Linux Live virtual Machine
   (refer to **step #7** in INVESTIGATION 1   )

   Although you will be learning to create and run **shell scripts** (near the end of this course)
   in your **Matrix** server , those scripts will only run in a **command-line** environment.

   Since you are running a **graphical** **Knoppix** Linux distribution on your computer,
   you can run scripts graphically (including the use of **dialog boxes** for *input*, *output*,
   etc.).

2. Make certain that you are in a **Konsole**
   terminal window
   (but **NOT** connected to your Matrix
   account).

Graphical **input dialog box**.
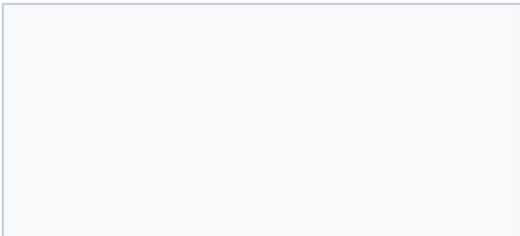
3. Issue the following command to **download** a shell script called **week7-demo-1** from the Internet:

   wget
   https://matrix.senecacollege.ca/~murray.saul/week7-demo-1
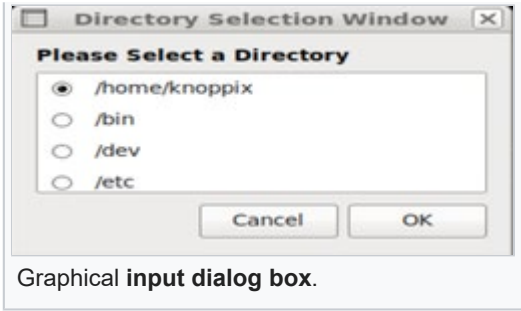
4. Issue the **ls** command to confirm that the file called **week7-demo-1** has been downloaded to your current directory.

5. Issue the following to run this shell script:

   bash week7-demo-1

6. In the dialog box, click to select the **/home/knoppix** directory and click **OK**.

   What did you notice?

7. Issue the following Linux command: **ls -l week7-demo-1**

   Notice there are NO **execute** permissions for this shell script file.
   That is why we have to issue the **bash** command followed by
   the **shell script file pathname** (as an argument) to run the shell script.

   Let's **add execute permissions** so we can run this command by name
   (i.e. without using the **bash** command).

8. Issue the following command to **add execute permissions** for everyone for the **week7-demo-1** file: **chmod +x week7-demo-1**

   FYI: This method is a **quick** method of adding execute permissions for the **owner**, **same group members** and **others**.

   Graphical **output dialog box**.

9. Issue the **ls -l** command for this file to confirm execution permissions were properly added.

10. Issue the following: **./week7-demo-1**

    Did the shell script run?

NOTE: The shell script uses the **zenity** command to create dialog boxes. Although you may need to install this application in other Linux distributions, it is automatically included with the Knoppix distribution. We don't learn about the *zenity* command in this course, but here is a link to some simple examples using this command in case you are interested: How to Use Zenity

REMEMBER: You **CANNOT** run this graphical shell script on your **Matrix** server, since Matrix is only a **COMMAND-LINE environment** and NOT a **graphical environment**.

11. Issue the Linux command: `exit` to **close** the **Konsole** terminal window.

Knoppix WIKI in the **Firefox** web-browser.

The **LibreOffice** word processor.
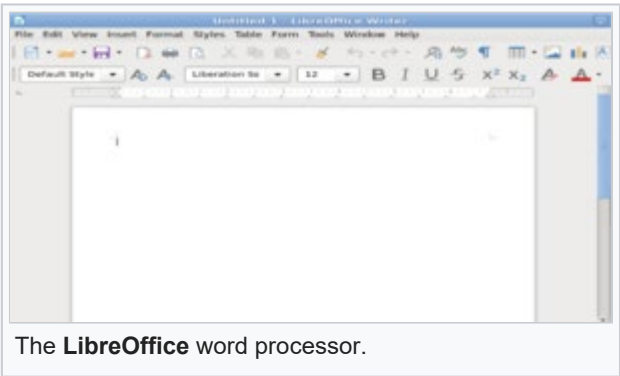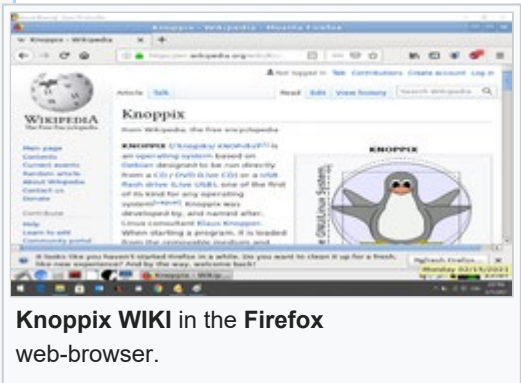
12. Use the *Knoppix start menu* and search the **Internet** submenu to launch the **firefox** web-browser.

13. In the web-browser, go to the **Google** website and perform a *Net-search* on the **Knoppix wiki**.

14. When finished browsing the Knoppix WIKI, **close** the *Firefox* web-browser.

15. Use the *Knoppix start menu* to select **Office** and then select **LibreOffice - Writer** to launch a *word processing* application.

    NOTE: Libre office is a <u>free</u> **open-source suite** of productivity tools for creating *documents*, *spreadsheets* and *slide presentations*.

16. Create a new document, type in a paragraph and then **save** changes to the file **mydoc** to your home directory,
    and **exit** the Libreoffice word processing document.

17. Use the *Knoppix start menu* to select **logout**,
    then select **shutdown** to terminate your
    Knoppix Linux Live session.

18. Press **ENTER** when it indicates to **Remove your CD**.

Shutdown menu for Knoppix to terminal graphical Linux session.
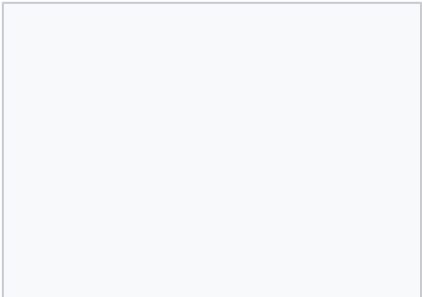
NOTE: Although you are NOT using a physical CD, this step is required to shut-down your Knoppix session and close your VirtualBox application.

19. **Launch** a new Knoppix Linux Live session (*INVESTIGATION 1*, **step #7**).

20. Use the *Knoppix start menu* to **launch** a **graphical** **file manager** (**Hint:** *Accessories -> Files*).

Graphical **file manager** for Knoppix.

21. In the file manager, search for your word processing document file and your downloaded shell script that were contained on your home directory.

    Does your word processing document or your downloaded shell script exist? If not, why?

22. Open the *Knoppix start menu*, select **games** and try running a few games (a few recommendations are: **Frozen Bubble**, and **Extreme Tux Racer**).

    Now that you have had an opportunity to use your Knoppix Linux Live distribution, let's shutdown the VM and move onto the practice questions at the bottom of this tutorial.

The **Frozen-Bubble** arcade game.

23. Open the *Knoppix start menu* and select **logout** and **shutdown** to end your Knoppix Live session.

LINUX PRACTICE QUESTIONS [edit]

The purpose of this section is to obtain **extra practice** to help with **quizzes**, your **midterm**, and your **final exam**.

Here is a link to the MS Word Document of ALL of the questions displayed below but with extra room to answer on the document to simulate a quiz:

https://ict.senecacollege.ca/~murray.saul/uli101/uli101_week7_practice.docx

Your instructor may take-up these questions during class. It is up to the student to attend classes in order to obtain the answers to the following questions. Your instructor will NOT provide these answers in any other form (eg. e-mail, etc).

Review Questions:

1. Define the term **Linux Distribution**.
2. List and explain **two advantages** of installing a Linux distribution on your home computer or laptop.
3. List and explain two things to consider <u>prior</u> to installing a Linux distribution on your home computer.
4. Explain why installing **Multi-boot** for Linux is useful for **computer troubleshooting**.
5. Define the term **Virtualization**.
6. List the **steps** to start the Knoppix Linux distribution from your home computer.
7. List **4 applications** that are contained in the Knoppix Linux Live distribution.
8. Explain the difference between a **Live Linux distribution** and an **installed Linux distribution**.

Category: ULI101

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