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How to Use This Lab Manual

This Lab Manual is designed for use with Mark Sobell's *A Practical Guide to Fedora and Red Hat Enterprise Linux, Seventh Edition*. Each of the labs includes page references to the Sobell book.

This Lab Manual has students work on a system on which they install Fedora 19 (the *student system*). The labs assume the student is working in a virtual environment using VMware Player or on a stand-alone physical computer.

Hardware and Software Requirements

- **Student system**—The physical or virtual student system must have at least 1 gigabyte of RAM and 25 gigabytes of free disk space. When you use the ISO image file (and not when you use the DVD) you need an additional 4 gigabytes of free space. On a shared system, the disk space must be available on an external drive. Lab 1 and Lab 2 guide the student through setting up this system.

The student system and the classroom server

tip These labs refer to the system the student is working on as the **local system** or the **student system**. They refer to the classroom server system as the **classroom server** or **class**.

- **Classroom server**—The physical or virtual classroom server system must have at least 768 megabytes of RAM and 5 gigabytes of free disk space. This system can be installed by the student, provided by the instructor, and in some cases shared by the class. The classroom server is not required until Lab 18. Lab 46, which is available only to the instructor, explains how to set up the classroom server.

  Lab 18, step 1 on page 73 of this Lab Manual adds the name (**class**) and IP address of the classroom server to the **/etc/hosts** file of the student systems for use in all subsequent labs that make use of the classroom server. All students must follow these instructions to be able to follow the labs that refer to the classroom server as **class**.

- **Fedora 19 install DVD**—You can obtain this DVD from the back of the hardcopy version of the Sobell text. Alternately, you can download and use a copy of the Fedora 19 installation (ISO) image file; see Sobell, page 46 for more information. The DVD or ISO image file must be available on the student system. If you wish to use a version of Fedora 19 other than the 32-bit Intel version, you will need to download the ISO image file.

- **Nonprivileged users**—The primary user, which is created when you install the system, is named Sammy Student and has the username **student**. For simplicity, all nonprivileged users have the same password: **fit714tree**. Normally, when you set up a Linux system, each user will have her own

password. See Sobell, page 136 for information on selecting secure passwords.

Because these labs build on preceding labs, it is important that you set up users as described in the labs.

- Lab 7 (page 30) adds **ben**, **max**, and the **linux** group.
- Lab 13 (page 56) adds **casey** and the **staff** group.
- Lab 14 (page 60) adds **rose**.

- **Student's initials**—Several labs ask you to write files to the classroom server. To keep students from overwriting other students' files, you are asked to append your initials (*XXX*) to the names of these files. Before you start working with this Lab Manual, make sure that each student uses initials that are unique among the students that will be working with the classroom server.
- **Privileged user (root)**—The privileged user with the username **root**, also referred to as Superuser, has the password **bird482dog**. You also set up this user when you install the system.

If the student system does not have Internet access

tip A few labs require access to software packages that are not included on the Fedora 19 install DVD. These labs explain how to download and install these packages using an Internet connection. For student systems without Internet connectivity, these packages must be downloaded in advance and made available to the student system. The packages that are required but not included on the Fedora 19 install DVD are:

- **autofs**
- **openldap-servers**

You can download these packages from download.fedoraproject.org, which redirects to a mirror site. Navigate to the **releases/19/Fedora/i386/os/Packages** directory (replace i386 with x86_64 if you are using a 64-bit system). Download these packages to the student system or to removable media.

Additionally, Lab 32 requires the source code tarball for the which utility (**which-2.20.tar.gz**). You can download this file from ftp://ftp.gnu.org/gnu/which and make it available on the student system.

ANSWERS

Answers appear in the Instructor Version of this Lab Manual; answers do not appear in the Student Version.

```
$ echo 'example of an answer' # Appears only in Instructor Version
```

Please send any corrections, additions, or comments to the author at mgs@sobell.com. Mention the version of this Lab Manual as shown on the title page.

LAB 1: SETTING UP THE STUDENT SYSTEM (10–15 MINUTES)

The first part of this lab describes how to set up a virtual student system (VM or virtual machine) using VMware Player (Option 1; next). The second part describes how to set up a stand-alone physical system (Option 2; page 9 of this Lab Manual). Both options explain how to set up the system so that you can install Fedora from the Install Image DVD or the DVD ISO image file and end with the system paused with the Install Image Boot menu (Sobell, Figure 3-4 on page 61) displayed on the screen. The installation steps are covered in Lab 2 (page 11).

The student system and the classroom server

tip These labs refer to the system the student is working on as the **local system** or the **student system**. They refer to the classroom server system as the **classroom server** or **class**.

OBJECTIVES

In this lab you will set up a VMware instance (Option 1) or stand-alone system (Option 2) on which you will subsequently install Fedora.

SETUP

- VMware Player version 6 or a stand-alone physical system
- Fedora 19 Install Image DVD or, on a VM only, a DVD ISO image file on the host system
- 25 gigabytes of free disk space on either
  - An external USB hard disk *or*
  - The VM or stand-alone system (if no one else will be using it)

OPTION 1: SETTING UP A STUDENT SYSTEM USING VMWARE PLAYER

PROCEDURE

1. Create a new VM (virtual machine) for the Fedora installation. See "VMware Player: Installing Fedora on VMware" on page 671 of Sobell for detailed instructions. Simplified instructions follow.

   a. Launch VMware Player.

   b. Click **Create a New Virtual Machine**.

   c. Click the radio button labeled **I will install the operating system later** and then click **Next**.

   d. Click the radio button labeled **Linux** and select **Fedora** from the drop-down list labeled **Version**. Click **Next**.

e. The default name of the VM is **Fedora**. Use the text box labeled **Name** to change the name of the VM so that it is unique within your class. Use the format *Fedora.**XXX*** where ***XXX*** are your initials.

   The text box labeled **Location** allows you to specify where you want to store the VM image (the files that define the VM). Select one of the following locations.

   - If several people share the local system, you can store the VM image on an external USB hard disk. Plug the disk into the local (student) system; the operating system will mount it. Once it is mounted, specify the mount point in the text box labeled **Location** (you can click **Browse** to find it). Make sure the location includes the name you just specified at the end of the pathname (e.g., **/vmw/Fedora.STG**).
   - If you are the only user on the local system, you can accept the default location as long as there is enough space on the host hard disk to hold the VM.
   - Click **Next**.

f. Accept the default maximum disk size of 20 gigabytes (GB). Click the radio button labeled **Store virtual disk as a single file**; click **Next**.

g. Review the information in the next window and Click **Finish**. If a message about installing VMware Tools appears, click **Close** to return to the VMware Player window. Do not install VMware Tools.

2. Get VMware Player ready to boot to install Fedora 19.

   a. To use VMware Player to access the Fedora 19 install image, click the name of the Fedora image you just created on the left side of the window and click **Edit Virtual Machine settings** near the bottom of the window on the right side; VMware Player displays the Hardware tab of the Virtual Machine Settings window.

   b. Click **CD/DVD (IDE)** on the left side of the Virtual Machine Settings window. Make sure the check box labeled **Connect at power on** has a tick in it. If you are using physical install media (a DVD), click the radio button labeled **Use a physical drive** and select the mount point for the DVD from the drop-down list labeled **Device**. If you are using a DVD ISO image, click **Use ISO image** and enter the pathname of the image file (you can click **Browse** to find it). Click **Save**.

Do not take this step unless the installation has previously failed

tip This step causes installation on most machines to fail but enables installation on a few older machines to work. The following steps assume the Virtual Machine Settings window selected in step 2a is still open and displaying the CD/DVD tab.

- Click **Advanced** to display the CD/DVD Advanced Settings window and place a tick in the check box labeled **Use legacy emulation on physical devices**.
- Click **Close** to return to the Virtual Machine Settings window.
- Click **Save** to save the settings.

c. To start the installation, click the name of the Fedora image you just created on the left side of the window and click **Play virtual machine** near the bottom of the window on the right side.

d. Press CONTROL-G or click while the mouse pointer is over the VM window to direct input to the VM. (Press this key or click to make selections during the installation so that what you type goes to the VM and not to the host desktop.)

e. When the VM displays the Install Image Boot menu (Sobell, Figure 3-4 on page 61), click on the window and then press the SPACE bar to pause the countdown. Ignore the messages that appear in boxes at the lower-right of the window; they will disappear after a few seconds.

f. Press CONTROL-ALT to return the cursor to the host desktop.

3. Continue the installation with Lab 2 (page 11).

The next installation steps as described in Lab 2 are the same whether you are installing to a stand-alone physical system or a VM.

OPTION 2: SETTING UP A STUDENT SYSTEM ON A STAND-ALONE PHYSICAL SYSTEM

Although these labs focus on a student system that is installed on a VM, if you have the resources there is no reason you cannot set up the student system on a stand-alone physical system. Most of these labs will work exactly the same way with either setup; differences are noted.

Warnings

caution

- There is no information provided in these labs for a configuring dual-boot system. See Sobell, page 84 for more information.
- You are about to remove all information from the hard disk of the local machine. *You will lose all data on the machine.* Back up any data you want to save.

PROCEDURE

1. Get the stand-alone physical system ready to boot to install Fedora 19.
   a. Place the installation DVD in the DVD drive.
   b. Boot the machine.
   c. When the system displays the Install Image Boot menu (Sobell, Figure 3-4 on page 61), press the SPACE bar to pause the countdown.
2. Continue the installation with Lab 2 on the next page.

DELIVERABLES

A VM or stand-alone physical system that is paused while displaying the Install Image Boot menu (Sobell, Figure 3-4 on page 61).

LAB 2: INSTALLING FEDORA (30–50 MINUTES)

OBJECTIVES

In this lab you will work through the Anaconda installation, including customizing partitions, to install Fedora 19. This lab continues where Lab 1 left off.

SETUP

- A VM or physical system that is paused while displaying the Install Image Boot menu (Sobell, Figure 3-4 on page 61).

READING

Read the following sections:

- "Installing from an Install Image" on page 60 of Sobell
- "Manual/Custom Partitioning" on page 74 of Sobell

PROCEDURE

These steps continue from Lab 1 and assume the Install Image Boot menu (Sobell, Figure 3-4 on page 61) is displayed on the screen and paused. If you are using a VM, click on the VM window so the host directs your keystrokes to the VM. Press CONTROL-ALT when you want to once again direct your keystrokes to the host.

1. Begin the installation.
   a. Use the ARROW keys to highlight **Test this media & install Fedora 19** and press RETURN to begin the installation. If you have already tested the media you do not need to do so again: Highlight **Install Fedora 19** and press RETURN.

      Ignore the **Press the <ENTER> key to begin the installation process** message; the installation will continue after a moment without intervention.

      Testing the install medium takes a few minutes. After Anaconda completes the test it displays the Welcome to Fedora 19 screen.

   b. Highlight the language you want to use during the installation; click **Continue**. After a moment Anaconda displays the Installation Summary screen (Sobell, Figure 3-6 on page 64).

   c. Click **Network Configuration** and use the text box labeled **Hostname** to change the hostname to **linux.example.com**. Click **Done** at the upper-left corner of the screen to redisplay the Installation Summary screen.

   d. Scroll down and click **Installation Destination** to display the Installation Destination screen (Sobell, Figure 3-9 on page 73). The frame labeled **Local Standard Disks** will show a single 20-gigabyte (approximately)

disk with a tick in a circle on it. Click **Done** at the upper-left corner of the screen; Anaconda displays the Installation Options window.

2. Set up the initial disk partitioning.

   a. In the Installation Options window (Sobell, Figure 3-10 on page 74), click the radio button labeled **I want to review/modify my disk partitions before continuing**, make sure LVM is selected from the drop-down list labeled **Partition scheme**, and click **Continue**. Anaconda displays the Manual Partitioning window (Sobell, Figure 3-11 on page 75). Do not be concerned if the whole window is not displayed, the next step will remedy this situation.

   b. Create a default set of partitions by clicking **Click here to create them automatically**. The Manual Partitioning screen will look similar to that shown in Figure 3-11 on page 75 of Sobell, but the sizes of the partitions will be different.

3. Modify the partitioning as explained in "Manual/Custom Partitioning" on page 74 of Sobell. See also Sobell, page 40 for information on the swap partition and Sobell, page 44 for information on LVM.

   a. **Change the size of the swap partition**—Highlight the swap partition on the left side of the screen; the right side of the screen shows information about the LV (logical volume) named **fedora_linux-swap**. In the text box labeled **Desired Capacity**, replace the existing value with **1 GB** and click **Update Settings**; the left side of the screen reflects the change. The box labeled **Available Space** at the lower-left corner of the screen shows approximately 1 gigabyte (GB).

   b. **Change the size of the / (root) partition**—Highlight the **/** (root) partition on the left side of the screen; the right side of the screen shows information about the LV named **fedora_linux-root**. In the text box labeled **Desired Capacity**, replace the existing value with **15 GB** and click **Update Settings**; the left side of the screen reflects the change. The box labeled **Available Space** at the lower-left corner of the screen shows approximately 4 gigabytes.

   c. **Add a new partition**—Click the plus sign (**+**) just above the box labeled **Available Space**; Anaconda displays the Add a New Mount Point window (Sobell, Figure 3-13 on page 76). Select **/home** from the drop-down list labeled **Mount Point** and enter **2 GB** in the text box labeled **Desired Capacity**. Click **Add mount point**. Anaconda redisplays the Manual Partitioning screen showing the new **/home** partition. The box labeled **Available Space** at the lower-left corner of the screen shows approximately 2 gigabytes.

   d. **Accept the changes**—Click **Done** at the upper-left corner of the Manual Partitioning screen; Anaconda displays the Summary of Changes win-

dow. Click **Accept Changes**; Anaconda redisplays the Installation Summary window.

4. Begin the installation.
   a. Click **Begin Installation**; Anaconda displays the User Settings screen.
   b. See "User Settings" on page 68 of Sobell for instructions on how to add **bird482dog** as the **root** password (click **Root Password**) and how to add a user with a full name of **Sammy Student**, the username **student**, and the password **fit714tree** (click **User Creation**). Do *not* make **student** an administrator. Do require a password. You will have to click **Done** twice in each window because you are specifying a weak password. See Sobell, page 136 for information on choosing a secure password.
   c. Return to the Configuration screen and wait for the installation to complete. Installing Fedora takes a long time; watch the progress bar to see how much of the installation is complete.
5. Finish up.
   a. When Anaconda displays the message near the bottom of the window saying it has successfully installed Fedora and asks you to reboot the system, click **Reboot** and, if you are using a DVD, remove it.

If you are using VMware Player and a DVD and the installation fails at this point

tip If you are installing Fedora from a DVD (and not an ISO image file) using VMware Player and the installation fails at this point, start over from the beginning of Lab 1 (page 7). This time, follow the instructions in the tip on page 9 of this Lab Manual. A failed installation leaves files for the virtual machine on the disk. Either remove this virtual machine before trying to install it again, or give the new virtual machine a different name.

   b. The system reboots and, after a few moments, displays the Login screen (Sobell, Figure 4-1 on page 91).

DELIVERABLES

A newly installed Fedora 19 system booted and waiting for Sammy Student (username **student**) to log in.