Deploying a LAMP Server

Learning Objectives

Learn how to set up a LAMP server for production purposes using Debian.

Download Prerequisites

You must download two files to complete this tutorial. Those files are:

- *VirtualBox* (virtualbox.org)
- *Debian Linux* *(Download a "Small Installation Image" from debian.org. 32-bit for i386 systems. Should be about 180 MB in size.)*

Install VirtualBox

You will be installing a piece of virtualization software that can be used to create virtual machines on your Mac. There are several different types of virtualization software, but for this tutorial you will be using VirtualBox. More information can be obtained by visiting their website, virtualbox.org. For more information on virtualization in general read chapter 23 in the book. Note that the software is updated from time to time and the steps required for a new version may differ slightly from these instructions. The principle will be the same. If you understand what we're trying to accomplish you should be able to figure it out.

1. Open the downloaded DMG file
2. Install VirtualBox by double-clicking on the VirtualBox.mpkg file and following the prompts.
3. Run the program from the Applications folder.

Create and Configure a New Virtual Machine

Now that you have VirtualBox installed, you must prepare a new virtual machine to house your Debian server.

1. Click <**NEW**> in the top left corner of the VirtualBox window.
2. Click <**Continue**> in the "Create New Virtual Machine" wizard. Name the virtual machine "Debian" and choose **Linux** and **Debian** from the drop-down boxes under "OS Type."
3. Set the RAM size to 256 MB.
4. On the "Virtual Hard Disk" page make sure "**Boot Hard Disk**" is checked and "**Create new hard disk**" is selected, then <**Continue**>, select <**Dynamically Expanding Storage**> and set the hard drive size to **2GB**. Click <**Continue**> then <**Done**>. You'll see a summary of your virtual machine. Click **<Done**>.

Now the Virtual Hard Disk has been created and is ready to have the operating system installed.

1. With your new VM selected click on **<Settings>** and then click on the **Network** tab. Set it to "**NAT**". Click on **Adapter 2** and choose **"Host-only Adapter"** Click **<OK>**. Depending on the software version of VirtualBox you are using you may need to set it to "**Bridged**."
2. Click **<Start>** on the VirtualBox window. A message pops up telling you about the keyboard auto capture feature. To release your keyboard and mouse from the virtual machine use the **Left** ⌘ key. Click <**OK**>.
3. The First Run Wizard will start since this is your first time running the VM. Under **"Select Installation Media"** click on the folder icon which will take you to the

"**Virtual Media Manager.**" Click **<Add>** and locate the Debian iso file that you downloaded. Then click **<Select>** then **<Continue>** and **<Done>**.

Install the OS

Now everything is in place and you are ready to install the Debian operating system. Select the "Graphical install" option, and use the default settings as you go except where stated below.

Network Interface: Choose eth0.

Partition disks: Select the default, "Guided - use entire disk" (Don't worry about screwing up your Macbook Pro hard drive. The "disk" it's referring to is nothing more than a file on your machine. Remember it's all virtual. When it asks you to write the changes to disk select **YES**.

Root password: P@55w0rd (not extremely secure but fine for our purposes)

Full name for the new user: Your first name

Password for new user: pAsSwOrD (this is purely to annoy you)

HTTP proxy information: Leave blank.

Note - It may take a while for the files install and at some points may appear to be frozen. Give it some time.

Software selection: Choose standard system ONLY. Do not select any of the other options. We want full control of what's installed. Use spacebar to deselect any selected options and hit tab to move to the continue button.

When the installation completes your virtual machine will restart and you will be prompted for a login.

Performing Initial Setup

Before continuing, you may want to create an snapshot, or backup of your current installation. To do so your virtual machine must be paused or turned off, select **Snapshots** in the VirtualBox window and click the <**Take Snapshot**> icon. This snapshot acts as a fail-safe, in case you run into an issue that may be irreversible.

After creating a snapshot, continue to login to the Virtual Machine using the username (your first name) and password you provided during the installation.

Note: Your password will not be displayed, not even with asterisks. This is done for security reasons.

Because most of the tasks you will be performing will require root access, it is easiest to login to the server as root. The root user is the ultimate administrator of the machine and has the ability to do anything on the system. You must be careful when running as root. Type;

su 

When prompted type the root user password that we established earlier.

Add Local Connection

In order for your OS X browser to be able to connect to this virtual server we need to add the second host-only adapter to Debian by adding a new Ethernet interface. Type the following;

nano /etc/network/interfaces

This is the configuration file for your network interfaces. Move your curser down to the bottom of the file and add the following lines:

allow-hotplug eth1
iface eth1 inet dhcp

Basically we're adding the same information for eth0 (the first Ethernet interface) and recreating it for eth1. When you're done hit ctrl+x, y for yes when it asks you if you want to save, and enter when it asks for the name to save it as. Now we need to restart the server. Type the following;

shutdown –r now.

Once it comes back up type the following command to find your IP address:

ifconfig 

You'll notice that there's a lot of information. Look under the **eth1** section (ethernet device 1) if you're using a wired connection. You should see ***inet addr:*** and then the ip address. That's what you'll plug into your web browser once we start testing the installations.

Update System

In order to check for software updates, the APT package list must first be updated. To do so, you can use *aptitude*, which is one of the few APT front-ends.

```
aptitude update
```

Now that the package list has been updated, you can continue to upgrade any outdated packages and install any security patches.

```
aptitude full-upgrade
```

Install Apache

To serve your files, you have to install an HTTP server, in this case, Apache.

```
aptitude install apache2
```

Your Apache 2 configuration file is located at: /etc/apache2/apache2.conf and your web folder is /var/www

Now we're going to see if your installation was successful. Use the IP address we found earlier and plug it into your web browser. If apache installed correctly you will see a web page that says "It Works!" If you don't see that you might be using the wrong IP address or you didn't install apache correctly.

Install PHP

To utilize any applications that require server-side scripting, you can install PHP

```
aptitude install php5 libapache2-mod-php5
```

Let's check that PHP5 was installed correctly. Run the following command to open up the nano editor and create a new php page called test.php:

```
cd /var/www/
```

```
mkdir apache2
```

```
nano apache2/test.php
```

With this page opened insert the following code into nano:

```
<?php phpinfo(); ?>
```

You can now save the file.
Point your browser to http://ipaddress/apache2/test.php and this should show all your PHP5 configuration and default settings. If it downloads the php file instead of opening it in the browser you need to restart the apache web server.

/etc/init.d/apache2 restart

Install MySQL

To use any applications that utilize a database, you can install the MySQL client and server.

aptitude install mysql-server mysql-client php5-mysql

The configuration file of MySQL is located at: /etc/mysql/my.cnf. When asked to choose a password for mysql input **mysqlpassword**.

You can add users to a MySQL database through a command line or by using a control panel like phpMyAdmin to easily create or assign database permissions for users.

Install phpMyAdmin

phpMyAdmin is a web based database management console which makes managing databases easier.

aptitude install phpmyadmin

In order for phpmyadmin to work you may need to add the following line in /etc/apache2/apache2.conf:

nano /etc/apache2/apache2.conf

… and add [**Include /etc/phpmyadmin/apache.conf**] without the brackets at the end of the file. Then restart Apache.

/etc/init.d/apache2 restart

The phpMyAdmin configuration file is located at: /etc/phpmyadmin

To log into phpMyAdmin open your web browser and navigate to http://ipaddress/phpmyadmin, and log in with username **root** and the password, **mysqlpassword**.

Take Final Snapshot

Congratulations, you have a spiffy new production LAMP server up and running! Now that it is up and running beautifully, you should take another snapshot of the Virtual Machine. This may prove useful if there is an issue down the road and you need to restore your server to a working state. Of course, you are not required to keep this installation and may delete it if you wish. Furthermore, in an actual production environment you would also install an SSH client and server so that you could access it remotely.

Now you need to output a list of the programs that have been installed on your machine. Type the following:

```
dpkg --get-selections > /programs.txt
```

This outputs the list and puts it into a new file called “programs.txt” at the root level of the server. Now use scp to upload the file to your user account on our WDD server.

```
cd /
scp programs.txt username@66.192.104.111:~/
```

Note: If you want to shutdown your Virtual Machine, you can run the command *shutdown -h now*, which will shut down all daemons immediately and power down the machine.