Internet & Network Services Assignment 1

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http://www.youtube.com/watch?v=0WFvUvdn5q8&list=UUwE-lElS0k514M1Q8kDXrdg

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EXECUTIVE SUMMARY

Objective

This document describes how to install and configure Moodle on Ubuntu 12.04 and above.

Goals

To show and give examples of how to install apache, php, mysql and LAMP on a server, to show how to install Moodle and the set up guide and to show how to secure the LAMP server.

Solution

You are required to build a secure Linux server using Ubuntu and to install and customise the application that you have selected.

Project Outline

- Install Lamp (Apache2, Mysql, Php)
- Update all packages
- Install Moodle
- Configure apache and Moodle
- Update and secure the server.

ABOUT MOODLE

Moodle is a free software e-learning platform, also known as a Learning Management System.
As of June 2013 it had a user base of 83,008 registered and verified sites, serving 70,696,570 users in 7.5+ million courses with 1.2+ million teachers. Equipped with a horde of smart features such as virtual quizzes, assignment submission, wiki, grading, IM services, and online discussion boards, Moodle enables a seamless online learning experience for end-users. Also, by virtue of being a modular software, it is capable of enhanced functionality through customised plugins.

ABOUT LAMP

LAMP is an acronym for an archetypal model of web service solution stacks, originally consisting of largely interchangeable components: Linux, the Apache HTTP Server, the MySQL relational database management system, and the PHP programming language

STEP 1 : INSTALLING UBUNTU SERVER

The first step we must take is to install Ubuntu onto our server using a CD drive. Follow the steps below and the on screen guide.

1. First, download and burn the ISO file from the Ubuntu Server download page.
2. Burn the ISO file to a CD.
3. Boot the system from the CD-ROM drive.
4. At the boot prompt you will be asked to select the language.
5. Select 'basic server install'.
6. Enter appropriate options for language, keyboard layout, network configuration, hostname and timezone.
7. You can then choose from several options to configure the hard drive layout.
8. **Remember to encrypt your home directory but See page 27 for notes on problems to be aware of.**
9. The Ubuntu base system is then installed.
9. You will be asked for you log in user name , enter thous.and your all good to go.
10. You can also run the following commands first.(To update the core system)

```
Sudo apt-get update

Sudo apt-get upgrade
```

STEP 2 : NETWORKING CONFIGURE

This guide is based on Ubuntu 12.04 server, so you should set up a basic Ubuntu 12.04 server installation before you continue with this guide. The system should have a static IP address. I use 192.168.0.100 as my IP address in this tutorial and server1.example.com as the hostname.
You can skip this part if you wish and come back to it later.

1. sudo su
2. nano /etc/network/interfaces

Make the necessary changes to the files so it looks like the following and plus ctrl + x:

```
# The loopback network interface
auto lo
iface lo inet loopback
# The primary network interface
auto eth0
iface eth0 inet static
        address 192.168.0.100
        netmask 255.255.255.0
        network 192.168.0.0
        broadcast 192.168.0.255
        gateway 192.168.0.1
        dns-nameservers 8.8.8.8 8.8.4.4
```

3. nano /etc/hosts

```
nano /etc/hosts
127.0.0.1       localhost.localdomain           localhost
192.168.0.100   server1.example.com             server1

# The following lines are desirable for IPv6 capable hosts ::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
```

Now run:

4. echo server1.example.com > /etc/hostname /etc/init.d/hostname restart
5. hostname hostname –f

On your own personal machine (Desktop) the same settings need to be configured so that the computer can talk to your server.

```
nano /etc/network/interfaces
```

Then edit the files below like so

```
# The loopback network interface
auto lo
iface lo inet loopback
# The primary network interface
auto eth0
iface eth0 inet static
        address 192.168.0.100
        netmask 255.255.255.0
        network 192.168.0.0
        broadcast 192.168.0.255
        gateway 192.168.0.1
        dns-nameservers 8.8.8.8 8.8.4.4
```

Next open the following networking file.

```
nano /etc/NetworkManager/NetworkManager.conf
```

In the file set “managed=true” – currently it will be set to false.

Now restart everything

```
/etc/init.d/networking restart
```

STEP 3 : INSTALL LAMP (LINUX , APACHE , MYSQL AND PHP)

I will be using root credentials(which give me complete control over the server), if you are doing installation with any other user just prefix sudo before all commands:

1. First Login into the server , using the username and password.
2. Next type in Sudo Su.
3. It will ask you for the password again.

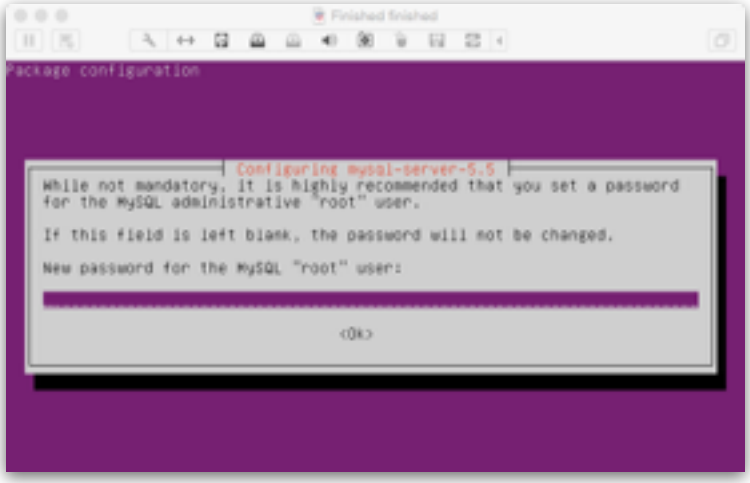
Now we have root credentials!

Next we need to install Apache, MySQL and PHP before the Moodle installation.

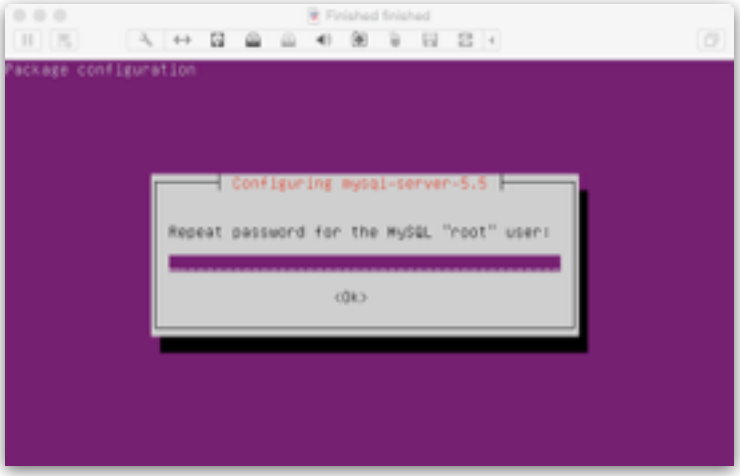
```
apt-get -y install apache2 mysql-client mysql-server php5
```

You will be asked to provide a password for the MySQL root user this password is valid for the user *root@localhost* as well as *root@server1.example.com*, so we don't have to specify a MySQL root password manually later on:

New password for the MySQL "root" user:



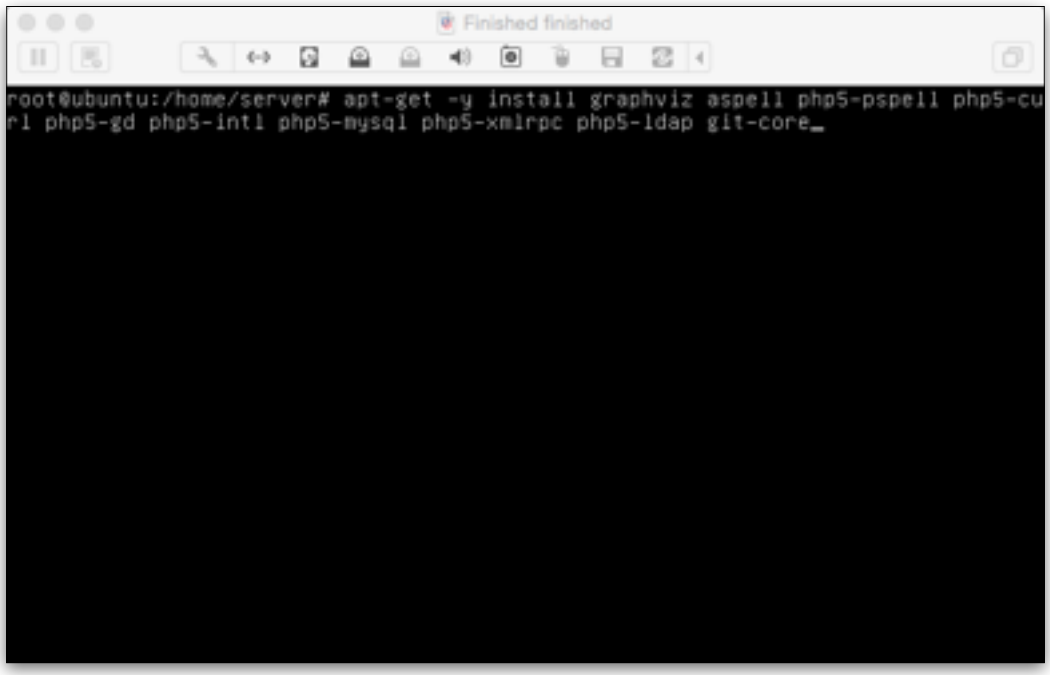
Repeat password for the MySQL "root" user:



Moodle require some more packages we will install them as follows:

```
apt-get -y install graphviz aspell php5-pspell php5-curl php5-gd php5-intl php5-mysql php5-xmlrpc php5-ldap git-core
```

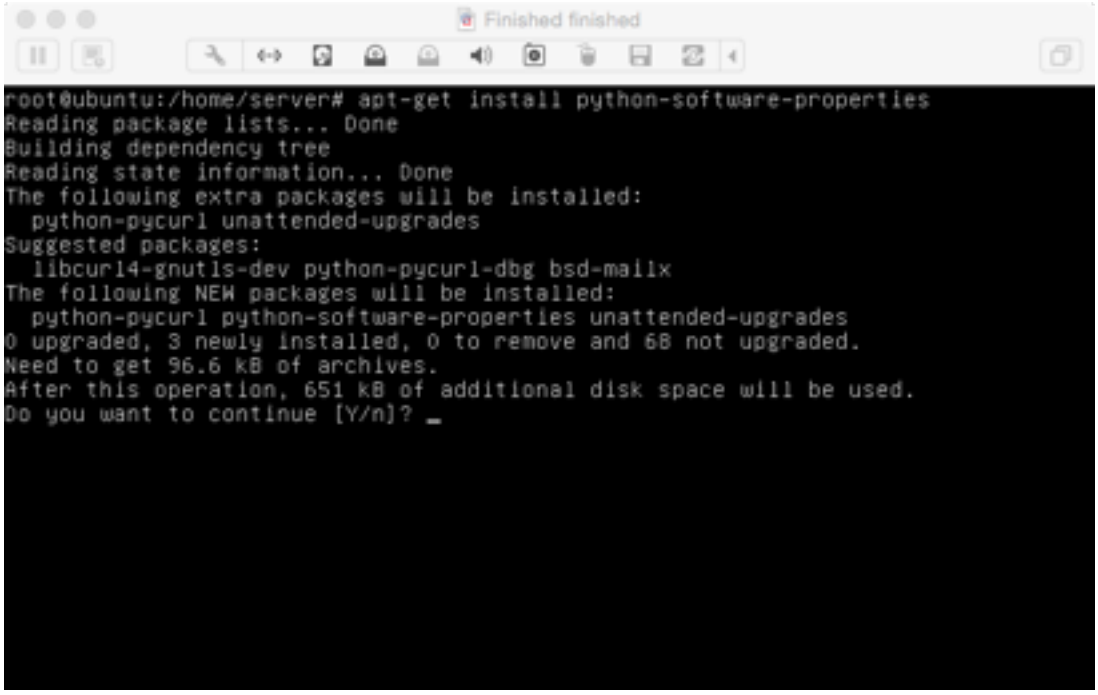
I will be using git utility for downloading Moodle so I have installed git-core.



STEP 4 : UPDATING PHP

For ubuntu 12.04 it has php.5.3 installed and it needs PHP 5.4 for Moodle to run.
IT will always download php 5.3, so we need to force there update.
So we need to install python packages which allow manage the repositories that you install software from.

```
sudo apt-get install python-software-properties
```



After this we need to download the following personal packages. This is an unofficial package that is supported by the community to manual update php tot he latest version
This branch follows latest PHP packages as maintained by the Debian pkg-php team.

So Follow the next four steps to install the php5 packages and to update the system and then to install php.

1. sudo add-apt-repository ppa:ondrej/php5
2. sudo apt-get update
3. sudo apt-get upgrade
4. sudo apt-get install php5

STEP 5 : DOWNLOAD MOODLE

We will download Moodle.ß

First we need to change the dirctenory to the /op . Which is used for the optional add-on software packages, or anything that isn't part of the base system (Ubuntu).

1. cd /opt

Next we need to download a “clone” of Moodle source code from the source folder “Repository”.

2. git clone git://git.moodle.org/moodle.git

Next we need to change to the folder called ‘moodle’ which was downloaded from the ‘clone’

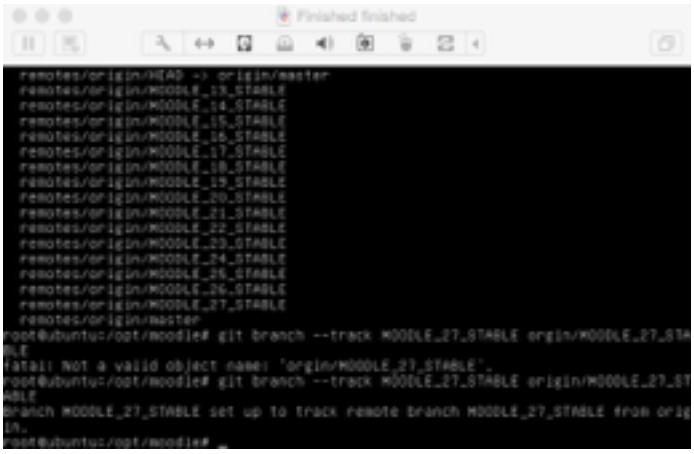
3. cd moodle

Next we will show all the available versions of moodle , these are called ‘branches’. They are an off shoot from the main folder.

4. git branch -a

Next we will pick the latest version (version 27). We will track it , which is a local branch that is connected to a remote branch on the Moodle server. So where downloading it from there machine to ours.

5. git branch --track MOODLE_27_STABLE origin/MOODLE_27_STABLE



Now that we have it downloaded we need to finish the connection and switch to our local branch.

```
6.  git checkout MOODLE_27_STABLE
```

We have finished downloading moodle to our server so next we must install it.

STEP 6 : INSTALLING MOODLE

From step 4 , we should have Moodle installed. So now we will install Moodle to the server. You will need a normal computer to do this too.

First we need to copy the files we downloaded to the heart of the apache folder . This is called the htdocs folder (this is where all html,php etc) files are store on a web server.

cp mean copy.

```
1. cp -R /opt/moodle /var/www/html/
```

Next we need to create a folder called Moodle data , Mkdir allows us to create the folder.

```
2. mkdir /var/moodledata
```

Then we need to change the owner of the folders to us . Chown stands for change owner.

We will allow full read,write and execute permissions of the moodledata folder. 777 mean full writes, 000 means none.

```
3. chown -R www-data /var/www/html/moodle
4. chmod -R 777 /var/moodledata
```

Next we will give folder permissions to the Moodle folder in the htdocs folder .

755 means you can do anything with the file or directory, and other users can read and execute it but not alter it. Suitable for programs and directories you want to make publicly available.

```
5. chmod -R 0755 /var/www/html/moodle
```

So now we have the Moodle files moved and the permissions set in the apache htdoc folder.

Where almost there . So now for Moodle we need to change the default storage engine to **innodb.**

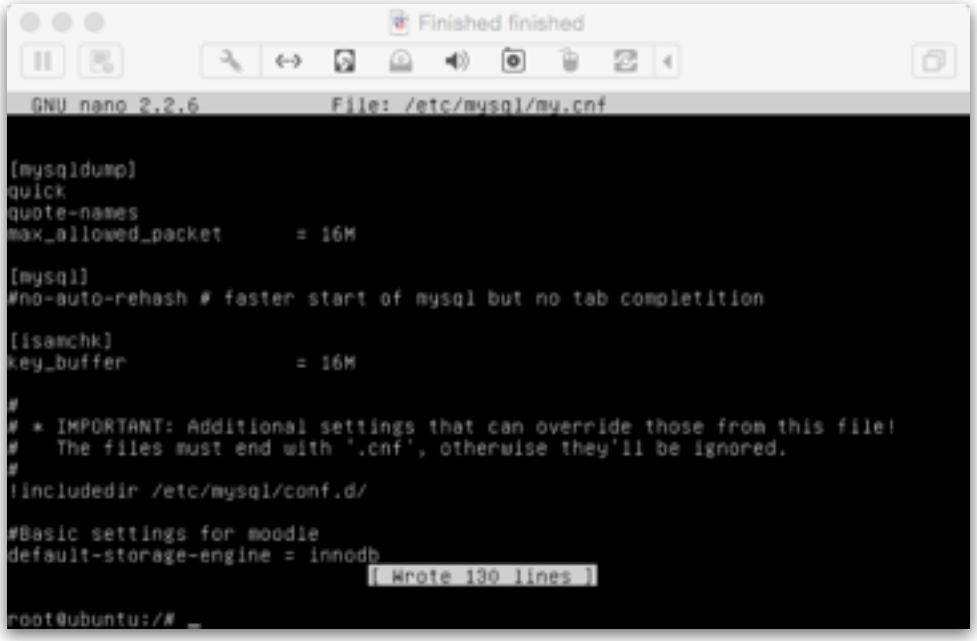
First we need to open the mysql database configure file. To do this we will input this command.

1. nano /etc/mysql/my.cnf

Next you will have to add the following two line to the bottom of the file.

This will set it as innodb. See below for an example.

- #Basic settings for doodle
- default-storage-engine = innodb



STEP 7 : DATABASE INITIALISATION

Following Step 5 , we should have Moodle files in place and installed on the server.
Next we need to create and set up the database and tables.

I will create the database for the Moodle as follows:

First we need to open up mysql , by using the following command.

```
1. mysql -u root -p
```

Note Here we are adding *database=moodledb user=moodleuser* and *password=zaqwsx*:

The first command we will create the database name 'moodledb' and the utf8 default encoding.

The second command we will give permisson to the user 'moodleuser' in the database we created. The user will created and identified by the password.

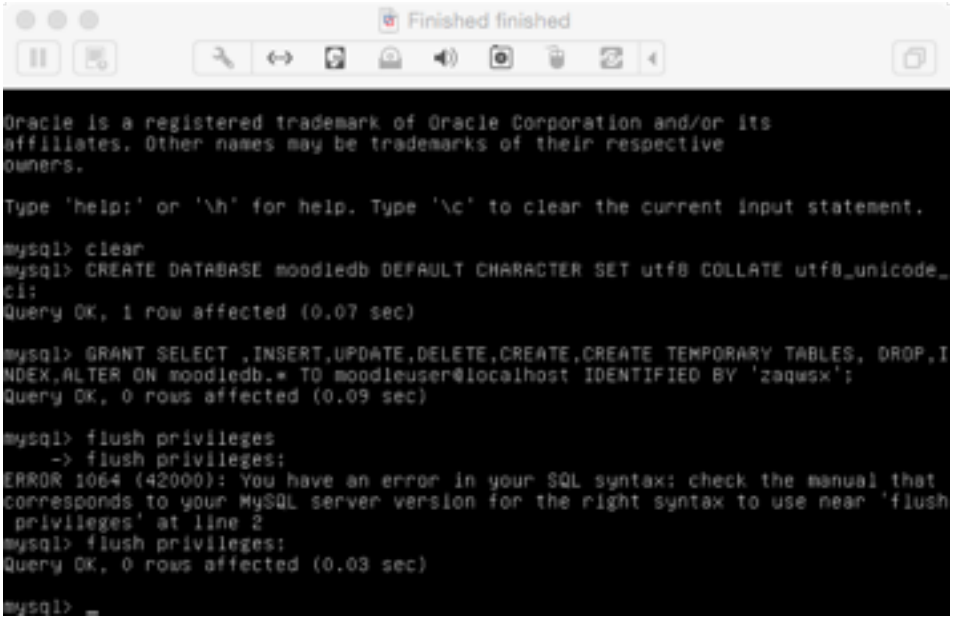
```
2. CREATE DATABASE moodledb DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci;

3. GRANT SELECT,INSERT,UPDATE,DELETE,CREATE,CREATE TEMPORARY TABLES,DROP,INDEX,ALTER ON
   moodledb.* TO moodleuser@localhost IDENTIFIED BY 'zaqwsx';
```

Next we will need to flush the privileges which flushes the in-memory copies of the privilege tables and reloads from the actual tables on disk.
Then we will exit mysql.

```
4. FLUSH PRIVILEGES;
5. Exit
```

See next page for a screen shot.



Now we have to restart everything. Make sure the settings are set.

6. service apache2 restart
7. service mysql restart

STEP 8 : CHANGING THE APACHE CONFIG FILES

In my Ubuntu 12.04 LTS, the document root was set to /var/www/html. It was configured in the following file:

/etc/apache2/sites-available/000-default.conf

So just do a command below , which will open it for us to edit it.

```
1.  sudo nano /etc/apache2/sites-available/000-default.conf
```

and change the following line to what you want:

DocumentRoot /var/www/html changed it to **/var/www/html/moodle/**

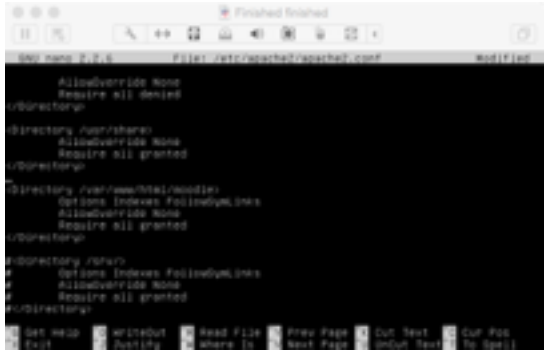
We also need to change the settings in the apache2 .config file.
So open it using the command below.

```
2.  sudo nano /etc/apache2/apache2.conf
```

Find the following few lines.

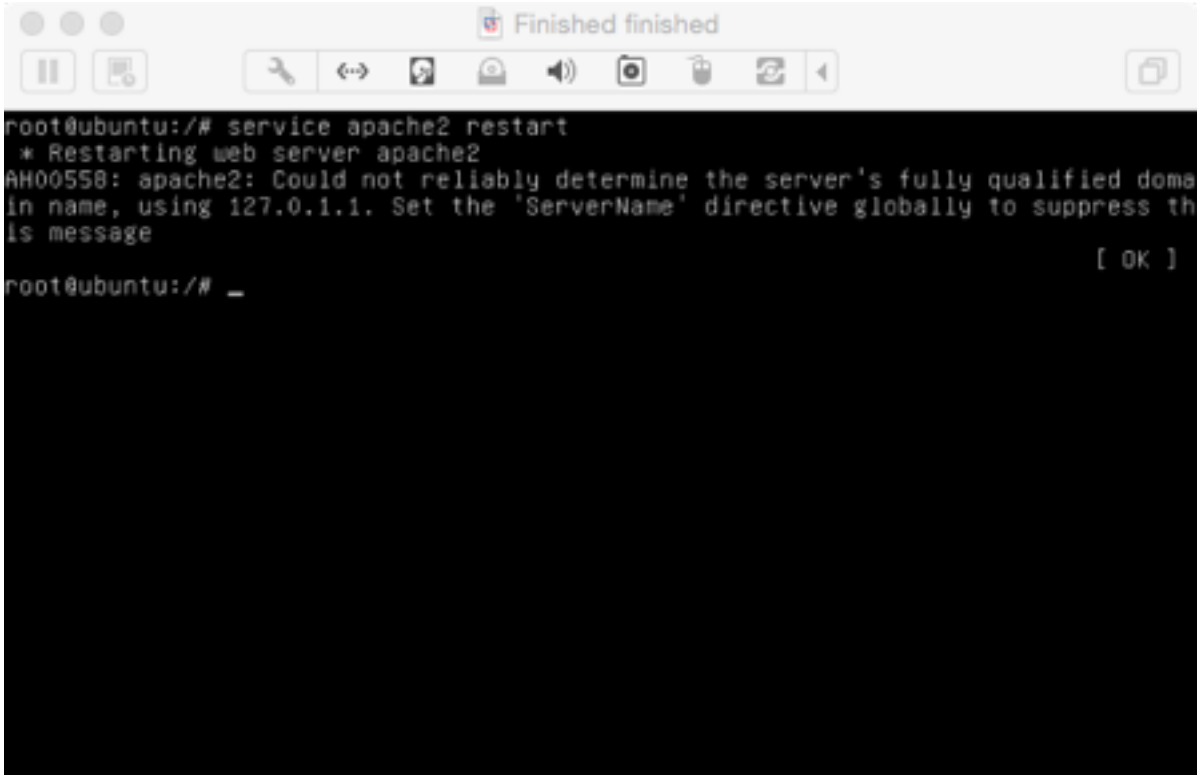
```
<Directory /var/www/html/>
Options Indexes FollowSymLinks
AllowOverride None
Require all granted
</Directory>
```

Change **/var/www/html** to your preferred directory and save it.
In our case where changing it to **/var/www/html/moodle/**



After you saved your changes, just restart the apache2 web server and you'll be done.
Using the commands below.

```
sudo service apache2 restart
```



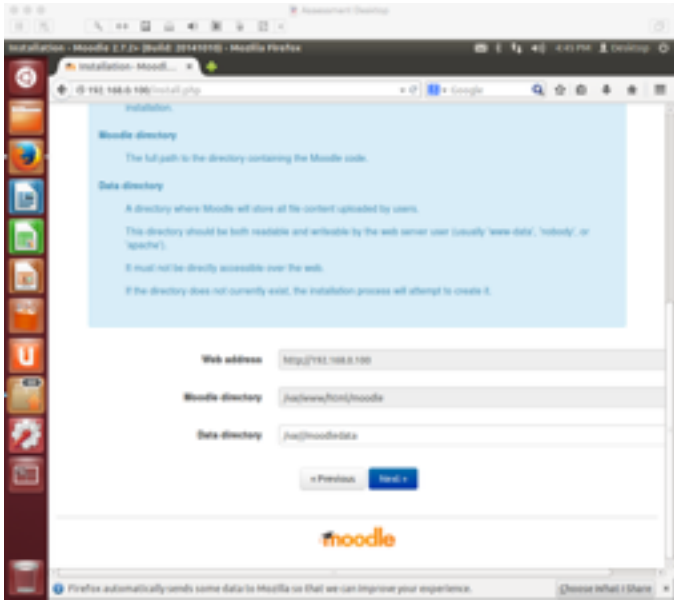
This will deny access to the whole filesystem except for the directories to which you want access allowed by modifying the server banner to give as little as possible information on the running software.

STEP 9 : WEB INSTALLATION OF MOODLE

First we will need to change to the desktop .

Now we will proceed with the Moodle web-installation. Open a browser of your choice and open the link http:192.168.0.100/install.php

6. Select your language and press Next:
7. Change the value of Data directory to **/var/moodledata** and the Moodle directory is **var/www/html/moodle**. and press Next:
8. Press Next again:



9. Give the values at the time of creation of the database, in my case it was as follows:

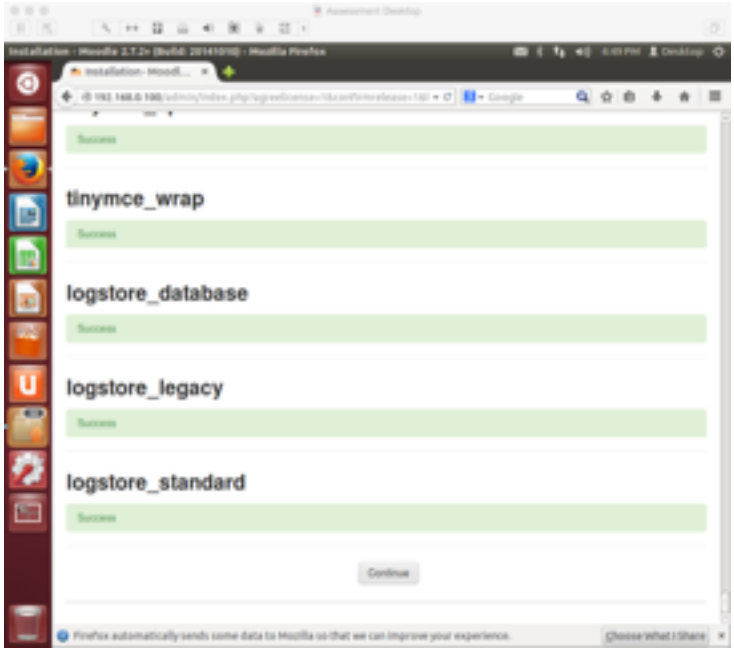
Database host : localhost
Database name : moodledb
Database user : moodleuser
Database password : zaqwsx
table prefix : mdl_ (or any value of your choice)
Database port : 3306
Unix socket : It will remain blank.

10. After giving the values press Next:

11. Press Continue:

12. You will see all the information installed .
    Press Continue again:

13. Press Continue:



14. Create An admin user for Moodle, you can use any value as per your choice. In my case I am using then after click update profile

Username : admin
New password : Gtibuddy123!
First name : Robert
Surname : Gabriel
Email : robert_gabriel@outlook.com

All other field I will be using its default value, of course you can change it later.

15. Next we will give the site details

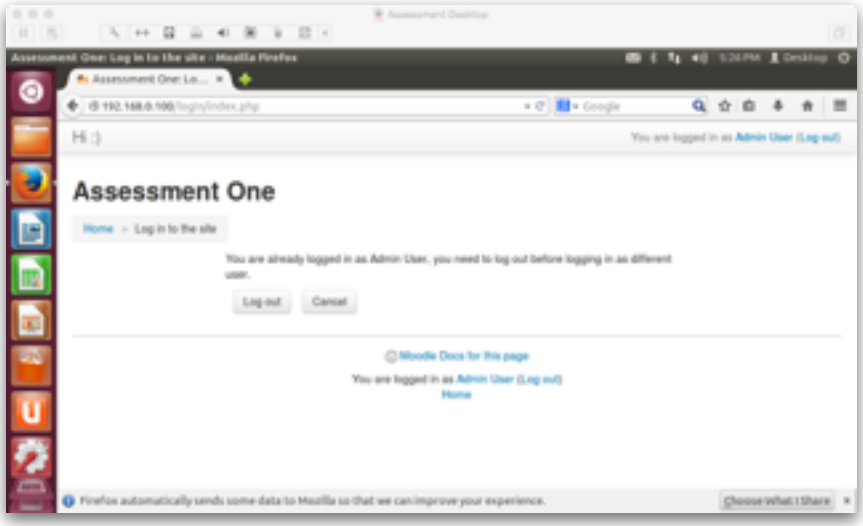
Full site name : AssessmentOne
Short name for site : hi :)
Self registration : Disable
After giving the values press Save changes:

16. Next click on the right menu on the settings

Path to du : /usr/bin/du
Path to aspell : /usr/bin/aspell
Path to dot : /usr/bin/dot

Press Save Changes.

Now we are done with the installation part of Moodle, We can access the Moodle page at http:// 192.168.0100/moodle/login/index.php as follows.



Now we can add courses and use Moodle as per our requirement. Congratulations! You now we have a fully functional Moodle instance on our Ubuntu 12.04

HOW TO HIDE APACHE VERSION AND OS IDENTITY FROM ERRORS

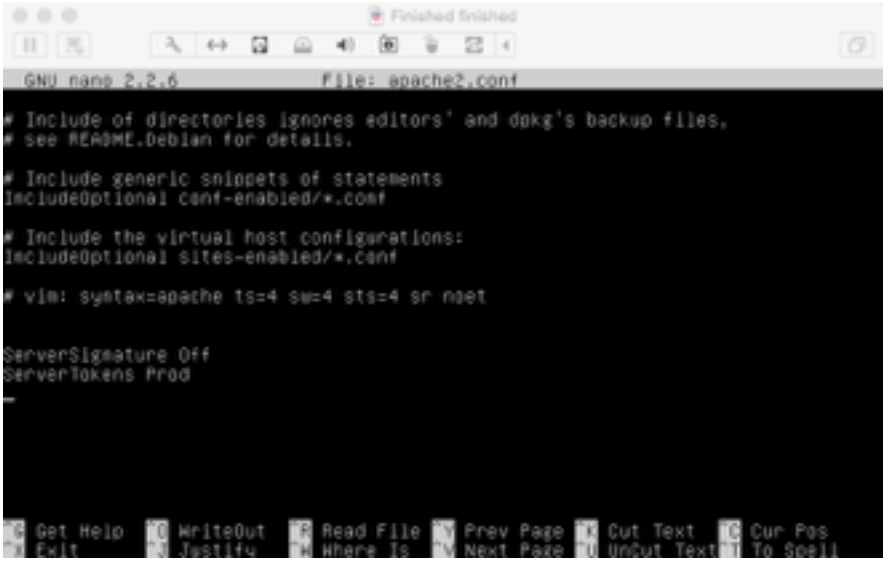
In above picture, you can see that Apache is showing its version with the OS installed in your server. This can be a major security threat to your web server as well as your Linux box too. To prevent Apache to not to display these information to the world, we need to make some changes in Apache main configuration file.

Open configuration file

1. Cd /etc/apache2/
2. nano /apache2.conf

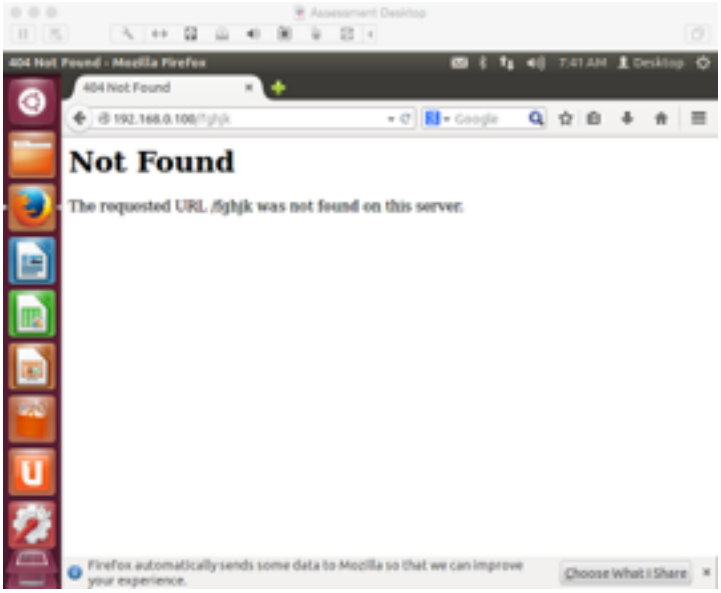
Then we need to add the following lines to turn off the server details. At bottom. Save the file again when finished.

- ServerSignature Off
- ServerTokens Prod



Restart apache

2. service apache2 restart (Debian/Ubuntu)



As you can see its not displaying the information.

DISABLE DIRECTORY LISTING

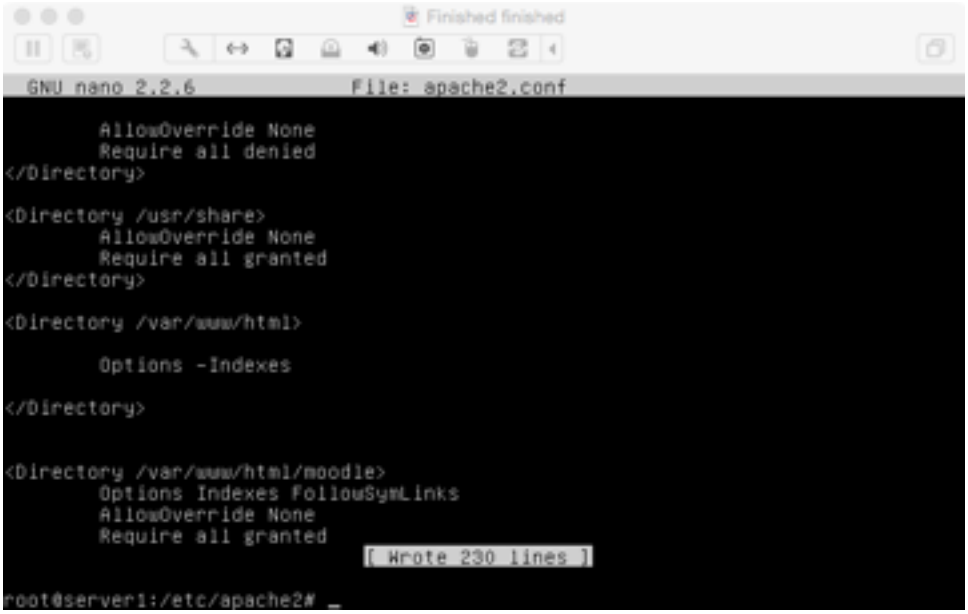
This allows the server to hide all files from being displayed .We can turn off directory listing by using Options directive in configuration file for a specific directory. For that we need to make an entry in httpd.conf or apache2.conf file.

Open configuration file

1. Cd /etc/apache2/
2. nano /apache2.conf

We then need to add the following lines

```
<Directory /var/www/html>
    Options -Indexes
</Directory>
```



Now we need to restart apache

1. service apache2 restart (Debian/Ubuntu)

SUMMARY & CONCLUSION

The installing of Ubuntu server and the desktop may look hard to the average person, however it is relatively uncomplicated if you follow the guides which are available online. What I have written here is a simple step by step guide to installing Ubuntu, with definitions for some of the commands so that the basic user can understand in basic English what is happening, so they can learn.

The overall installing of Ubuntu server is simple and straightforward thanks to the efforts of the huge community, making it easier to follow. The main problem which users may encounter is compatibility errors with different software, e.g. which version of PHP is needed to use the software.
For security fixes for a basic user, I tweaked the apache files to make the guide more suited to someone with very little computer knowledge.

If I had to redo the research, I would use a newer version of Ubuntu server because the PHP5. 3 error I talked about earlier in the report caused me a lot of problems and I had to do hours of research to resolve them. I would also use more snap shots for my VMware as when I was tweaking and changing the server settings, the security settings caused many errors.

In conclusion, installing Moodle on an Ubuntu server is straight forward, thanks to the very helpful online community and the online guides and videos which they provide. So if a user encounters a problem they can get online help and because Moodle is such a widely used software, indepth support is widely available.

PROBLEMS / NOTES

One of the problems I ran into was that I had to update the PHP from version 5.3. to 5.5, as Moodle needs PHP5.5 to run but 5.3 comes installed in the apache lamp packages.

As I explain on page Step 4 : Updating Php on page 10.

Buts its important to remember that if there is an error that isn't covered here, most answers to most questions about Moodle can be found via a quick Google search.

Encrypt your home directory

When choosing whether to encrypt your home directory or not, I recommend selecting 'No', because it makes it easier to do recovery if needed, for example if a corruption of data occurs.

App Armor

App Armor is a security extension that should provide extended security. In my opinion, you don't need it to configure a secure system, as it comes ready installed on all versions of ubuntu 12.01, up to the latest one.

If for some reason you wish to uninstall it, follow the instructions below.

```
/etc/init.d/apparmor stop

update-rc.d -f apparmor remove

apt-get remove apparmor apparmor-utils
```

REFERENCES

1. https://download.moodle.org/
2. http://www.bignosebird.com/apache/a7.shtml
3. https://help.ubuntu.com/community/ApacheMySQLPHP
4. http://phpave.com/upgrade-php-5-3-php-5-5-ubuntu-12-04-lts/