
edX Installation Documentation

Release 1.0.0

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1. Introduction

This section provides an introduction to installing Open edX on a single stand-alone computer.

Open edX is the software that powers edX-related online learning websites.

Open edX includes both a:

- Learning management system (LMS) for users to sign up, and register and take courses.
- Content management system (CMS), called Studio, to allow content providers to develop and publish content.

The edX environment has been developed using open source software. Open source software is software that has been licensed to be used by the general public for free.

edX software utilizes more than twenty four open source software languages, utilities, and technologies.

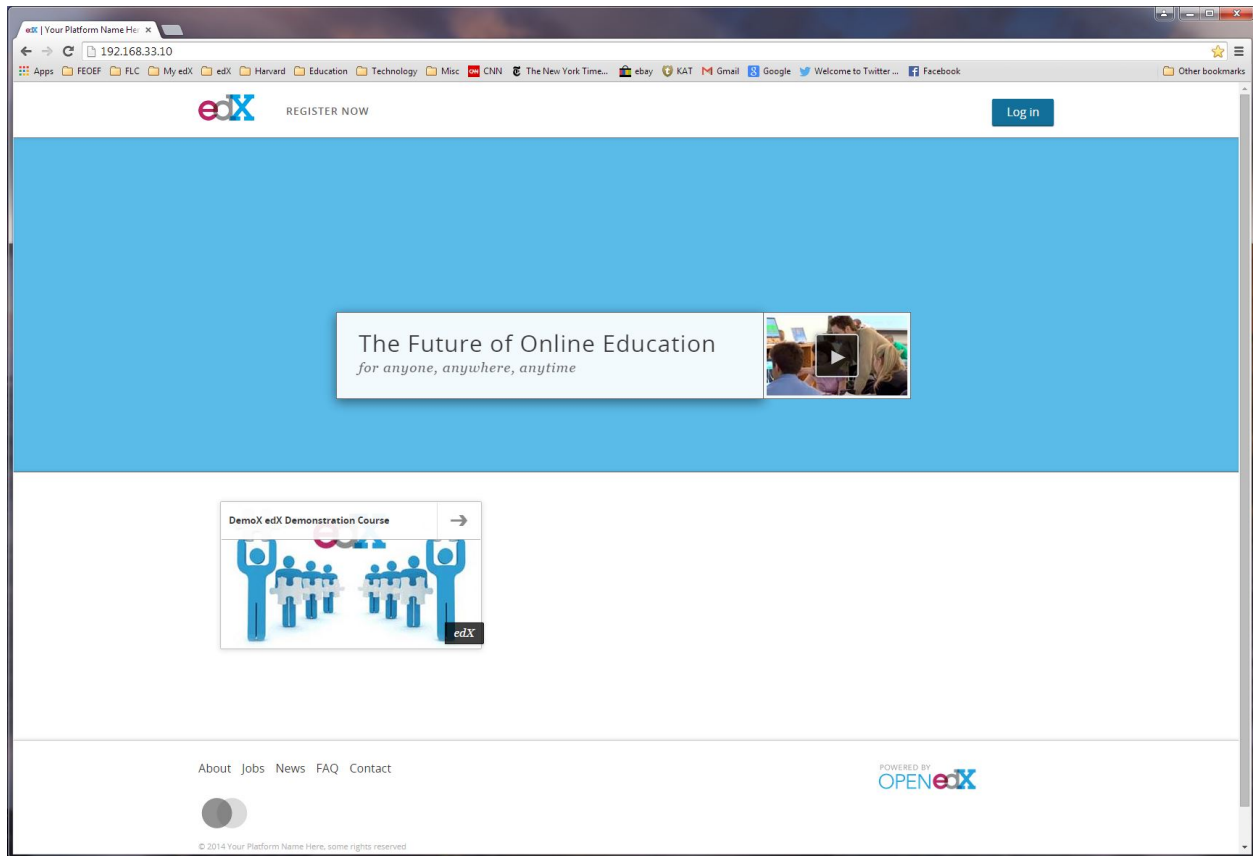
The operating system on which edX is based is Ubuntu, an open source Linux variant. The primary base programming language used to create edX is python.

Open edX provides scripts and documentation that can be used to install the Open edX environment.

1.1 The Goal

The ultimate goal of this documentation is to help you create a working instance of Open edX on a single computer, whereby a content developer could immediately use it to develop Open edX courses.

These instructions will describe the steps suggested to install a copy of the Aspen.1 production release of Open edX on a single Windows 7 Enterprise based personal computer.



1.2 The Overall Process

The overall installation process will involve the following major steps:

1. Install the host operating system, Windows 7 Enterprise Service Pack 1, and enable the Network File System (NFS) service.
2. Download additional required software.
3. Install the Oracle Virtual Box virtualization package.
4. Install the Vagrant provisioning and configuration package.
5. Install the cURL for Windows command line-based file transfer program.
6. Use Vagrant to download and install the Open edX environment.
7. Install additional useful software utilities.
8. Install and configure the mail system software.
9. Install and configure the Open edX-related Stanford Custom Theme.

1.3 The Result

After successfully installing the Open edX environment, you will have the ability to:

1. Login to the Learning Management System (LMS).
2. Login to the Content Management System (CMS), called Studio.
3. Register as a new user (as a student or staff member).
4. Register for a course (as a student or staff member).
5. Create new courses and content as a content provider and publisher.
6. Access the edX content from a browser running on your host operating system.

These steps will not necessarily make the courses available to anyone else, on the internet or otherwise.

More configuration will be necessarily for that.

The courses developed using this system could, however, be exported and then imported into a system that is accessible from the internet.

2. Prerequisites

This section describes the prerequisites for installing Open edX.

2.1 The Required Software Prerequisites

The Open edX platform has been implemented using a wide variety of software, including the python, ruby, and django programming languages, MySQL and mongodb database systems, the Nginx web server package, and the postfix email management system, to name a few.

To help ensure that the necessary software has been properly installed and configured to work together, several software installation and provisioning packages have been utilized.

To reduce the likelihood that the resulting edX development environment software will interfere with, or be disturbed by, other software already running on your computer, a virtual environment is used. The virtual environment created allows you to install an additional operating system on your computer, where you can then install software and run the operating system and software alongside your original operating system, as if it were running on a separate computer.

In our case, we will use Microsoft Windows 7 Enterprise as the host operating system.

Onto Windows 7 Enterprise, we will install a virtualization package and a few other software packages.

We will then execute a script provided by Open edX and its supporters that will create a virtual machine environment and install the rest of the edX platform software within that virtual machine environment.

You will need the following software:

1. Windows 7 Enterprise 64-bit
2. Virtual Box 4.3.16r95972
3. Vagrant 1.5.4
4. cURL for Windows 7.40.0

It would be helpful to go ahead and download these packages as a first step. Links to the packages are provided below.

2.2 1. Microsoft Windows 7 Enterprise

First, you will need the host operating system, Microsoft Windows 7 Enterprise, Service Pack 1.

You need the Enterprise (or Ultimate) version because that version comes with a systems service that the edX platform needs, called Client for Network File System (NFS).

Windows 7 Professional, and other versions of Windows 7, do not come with this NFS service.

You can buy a copy of Windows 7 Enterprise from Microsoft, a retail store, or online.

You can also download a 90 day evaluation copy of it from Microsoft here:

- <http://www.microsoft.com/en-us/evalcenter/evaluate-windows-7-enterprise>

2.3 2. Oracle VirtualBox

Oracle VirtualBox is open source software you can use to install additional operating systems onto your computer.

VirtualBox will give you the ability to create a *virtual machine environment*, which is a separate operating system environment into which you can install software and store data.

You will need Oracle VirtualBox Version 4.3.16, and the companion extension pack for it.

NB: Earlier or more recent versions of this package need not necessarily work, so, be sure to get this version, in particular.

The homepage for Oracle VirtualBox: <https://www.virtualbox.org/>

You can find the versions you need for 64-bit Windows 7 here:

- <http://download.virtualbox.org/virtualbox/4.3.16/VirtualBox-4.3.16-95972-Win.exe>
- http://download.virtualbox.org/virtualbox/4.3.16/Oracle_VM_VirtualBox_Extension_Pack-4.3.16-95972.vbox-extpack

2.4 3. Vagrant

Vagrant is open source software that will allow you to run scripts to more easily and reliably install and configure software.

A single Vagrant script will install the bulk of the operating environment for Open edX.

The Vagrant software version we will use is 1.5.4.

NB: Earlier or more recent versions of this package need not necessarily work, so, be sure to get this version, in particular.

The homepage for Vagrant: <https://www.vagrantup.com/>

You can find the Vagrant Version 1.5.4 that you need for 64-bit Windows here:

- https://dl.bintray.com/mitchellh/vagrant/vagrant_1.5.4.msi

2.5 4. cURL for Windows

cURL for Windows is an open source command line tool and library for transferring data and downloading software using URL syntax.

This tool will be used to download the Vagrant script file that you will use to install the bulk of the edX environment.

The homepage for Confused by Code: <http://www.confusedbycode.com/>

You can find the curl version that you need for 64-bit Windows here:

- cURL for Windows web page - <http://www.confusedbycode.com/curl/>
- cURL for Windows direct download link - <http://www.confusedbycode.com/curl/curl-7.40.0-win64.msi>

3. Install Operating System

Windows 7 Enterprise will be the base operating system onto which all the other software will be installed.

We will refer to it as the *host* operating system.

You need the Enterprise (or Ultimate) version because that version comes with a systems service that the edX platform needs, called Client for Network File System (NFS).

Windows 7 Professional, and other versions of Windows 7, do not come with this NFS service.

You can buy a copy of Windows 7 Enterprise from Microsoft, a retail store, or online.

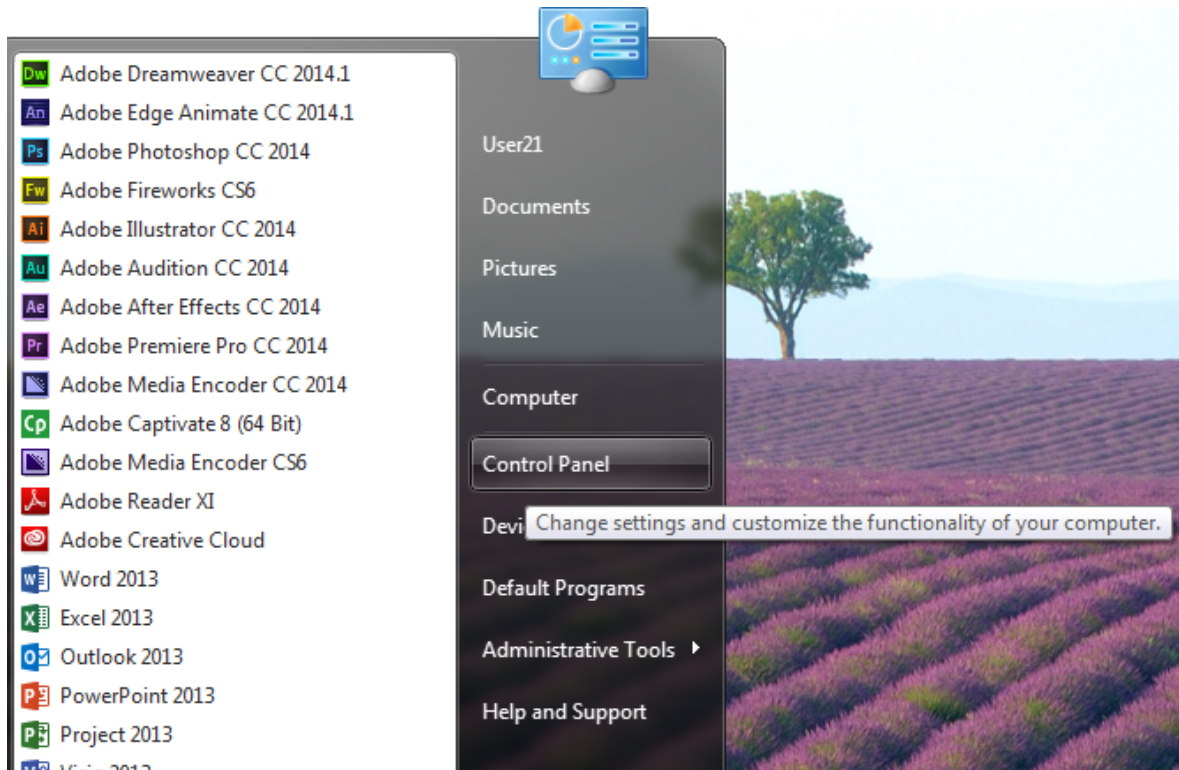
You can also download a 90 day evaluation copy of it from Microsoft here:

<http://www.microsoft.com/en-us/evalcenter/evaluate-windows-7-enterprise>

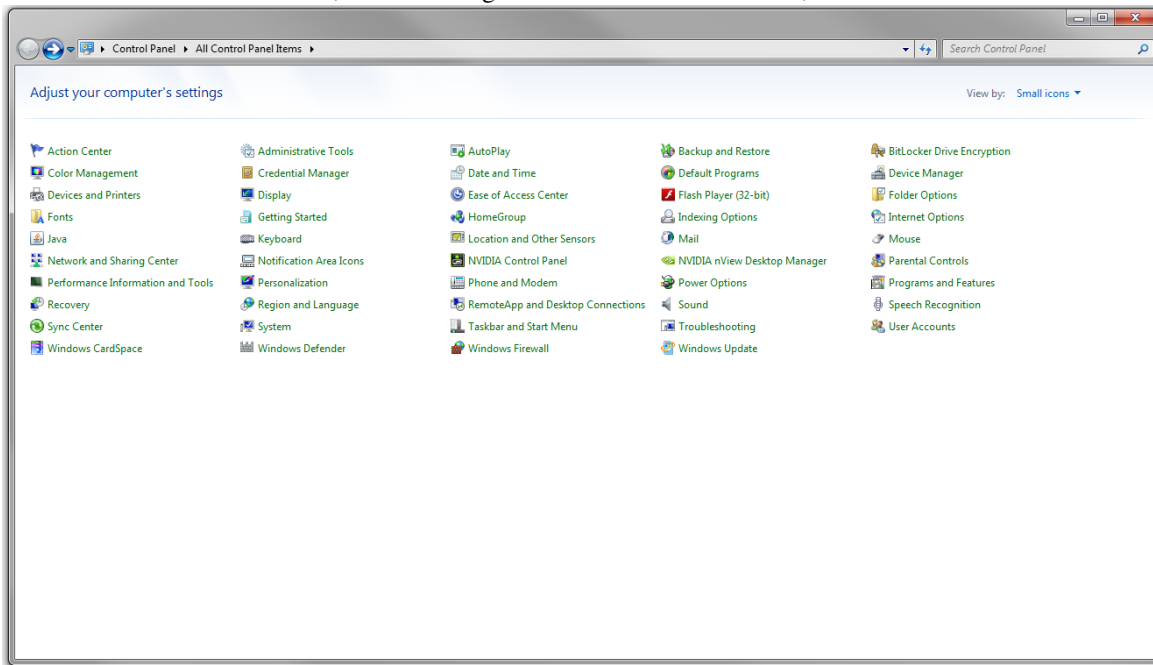
3.1 Install Windows 7 Enterprise and Enable (NFS)

To install the Client for Network File System (NFS) service, we can do the following:

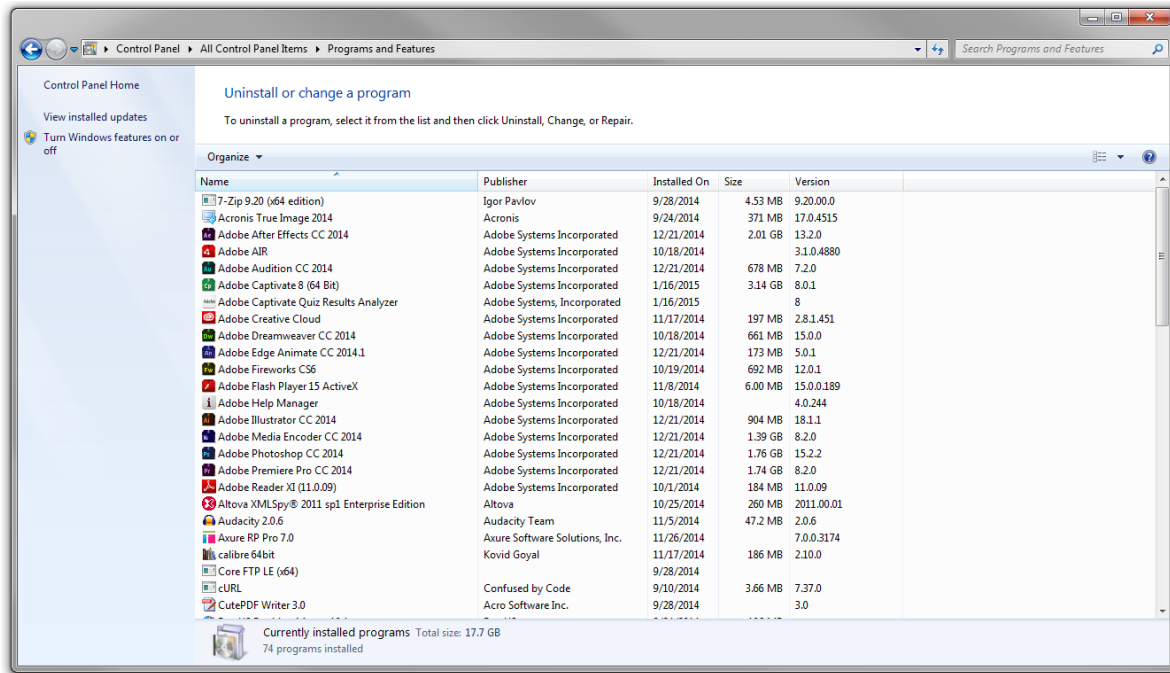
1. Install Windows 7 Enterprise as normal.
2. Click the Start button at the bottom left of the Windows Start menu, find “Control Panel” on the right side of the Menu Selection Panel, and CLICK it.



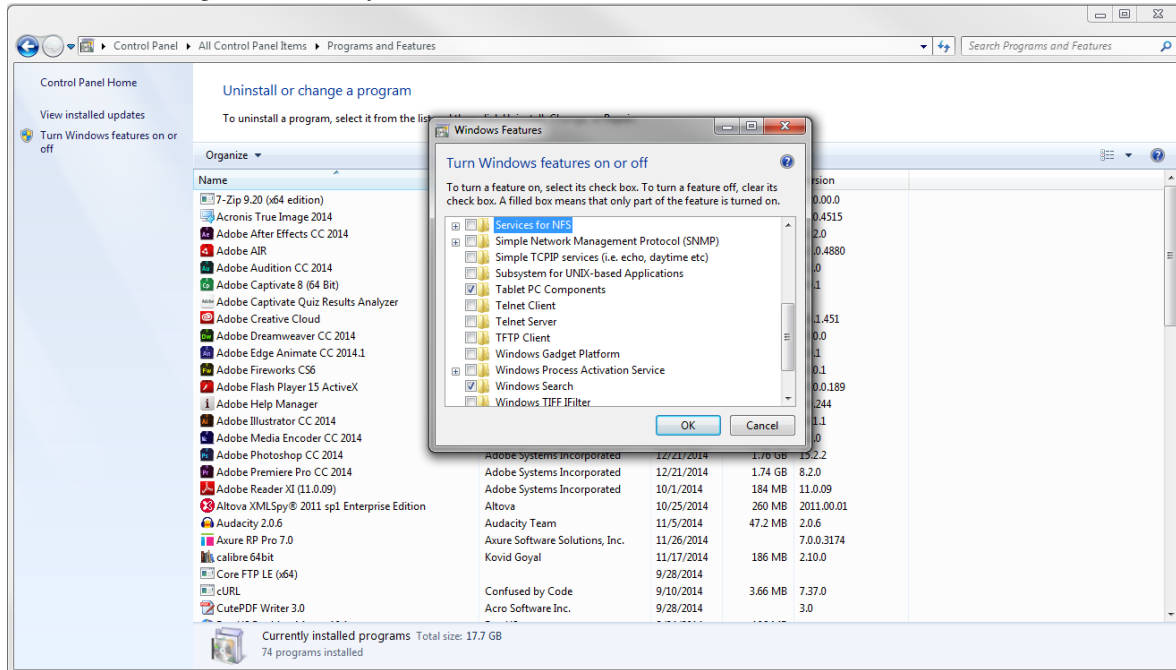
3. Within the Control Panel, find the “Programs and Features” selection, and CLICK it.



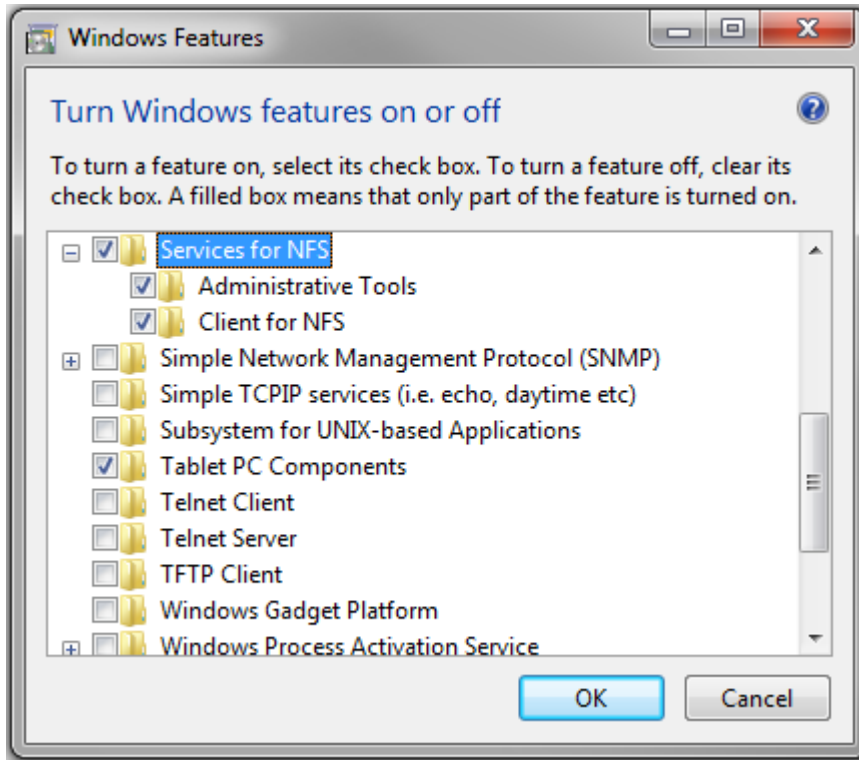
4. Within Programs and Features, find “Turn Windows features on or off”, on the left panel, and CLICK it.



5. Scroll through the list until you locate “Services for NFS”.



- CLICK the + plus sign to display both available options, and then CLICK all three checkboxes.



- CLICK the OK button to enable all the Services for NFS, including the Client for NFS service.
- Reboot the computer.

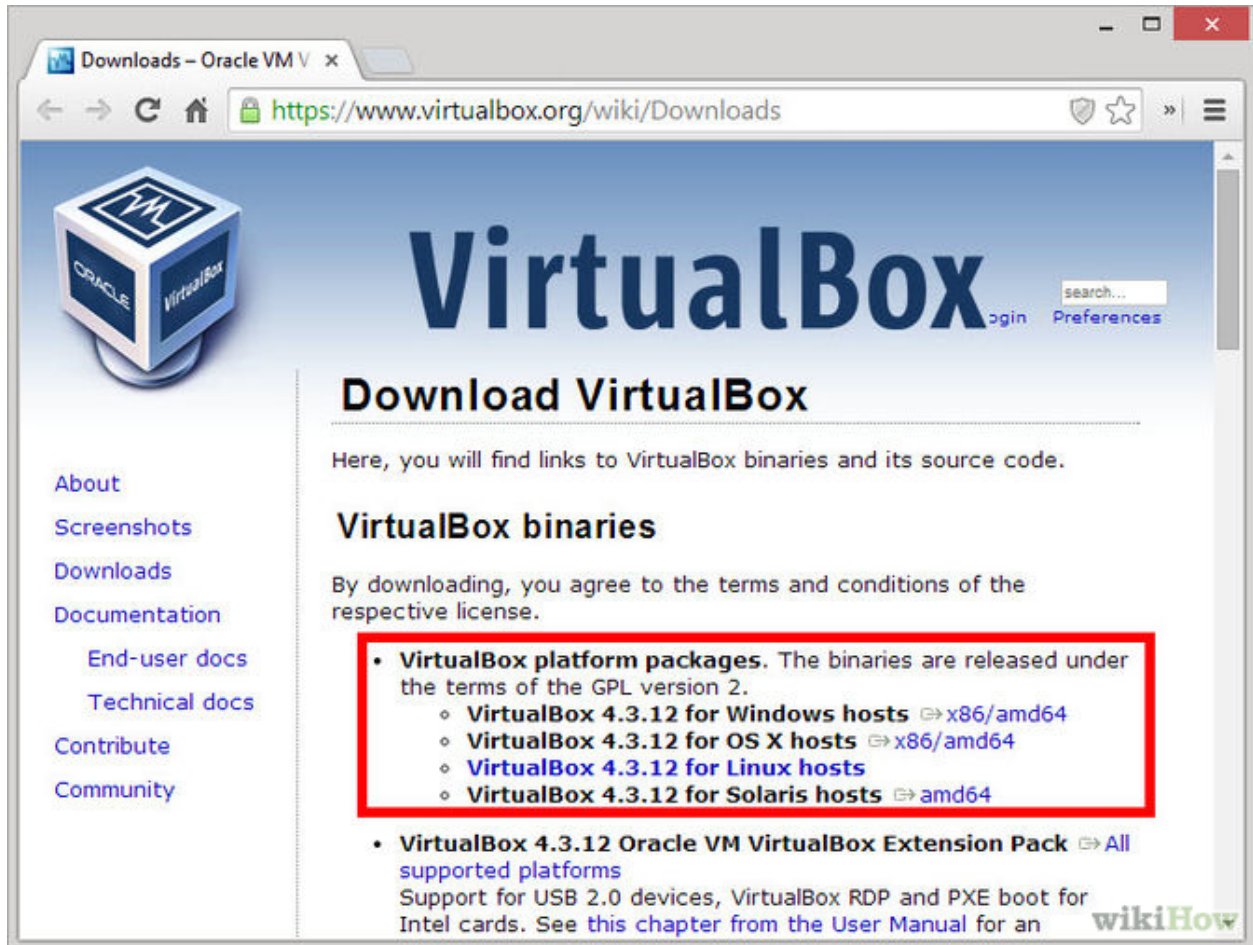
That completes the process for enabling Windows 7 Enterprise's NFS services.

4. Install Oracle VirtualBox

4.1 Background

Oracle VirtualBox is open source software that allows you to install additional operating systems onto your computer. VirtualBox extends the capabilities of your existing computer so that it can run multiple operating systems (inside multiple virtual machines) at the same time.

4.1.1 Oracle VirtualBox Download Page



(This image shows version 4.3.12, but we will not use that version)

4.1.2 Oracle VirtualBox Version for edX Installation

To install Open edX, we will use Oracle VirtualBox Version 4.3.16, and the companion extension pack for it.

Note that earlier, or even more recent, versions of this package might not be compatible with the rest of the platform. So, be sure to get this version, in particular.

The homepage for Oracle VirtualBox is here: <https://www.virtualbox.org/>

You can find the versions you need for 64-bit Windows 7 here:

- <http://download.virtualbox.org/virtualbox/4.3.16/VirtualBox-4.3.16-95972-Win.exe>
- http://download.virtualbox.org/virtualbox/4.3.16/Oracle_VM_VirtualBox_Extension_Pack-4.3.16-95972.vbox-extpack

4.2 Installing VirtualBox

1. Click the previously downloaded VirtualBox-4.3.16-95972-Win.exe setup program.
2. Follow the prompts to install. Accept all of the default option settings.

5. Install Vagrant

5.1 Background

Vagrant is open source software that will allow you to run scripts to more easily and reliably install and configure software.

A single Vagrant script will install the bulk of the operating environment for Open edX.

The Vagrant software version we will use is 1.5.4.

Note that earlier or more recent versions of this package need not necessarily work. So, be sure to get this version, in particular.

The homepage for Vagrant: <https://www.vagrantup.com/>

You can find the Vagrant Version 1.5.4 that you need for 64-bit Windows here:

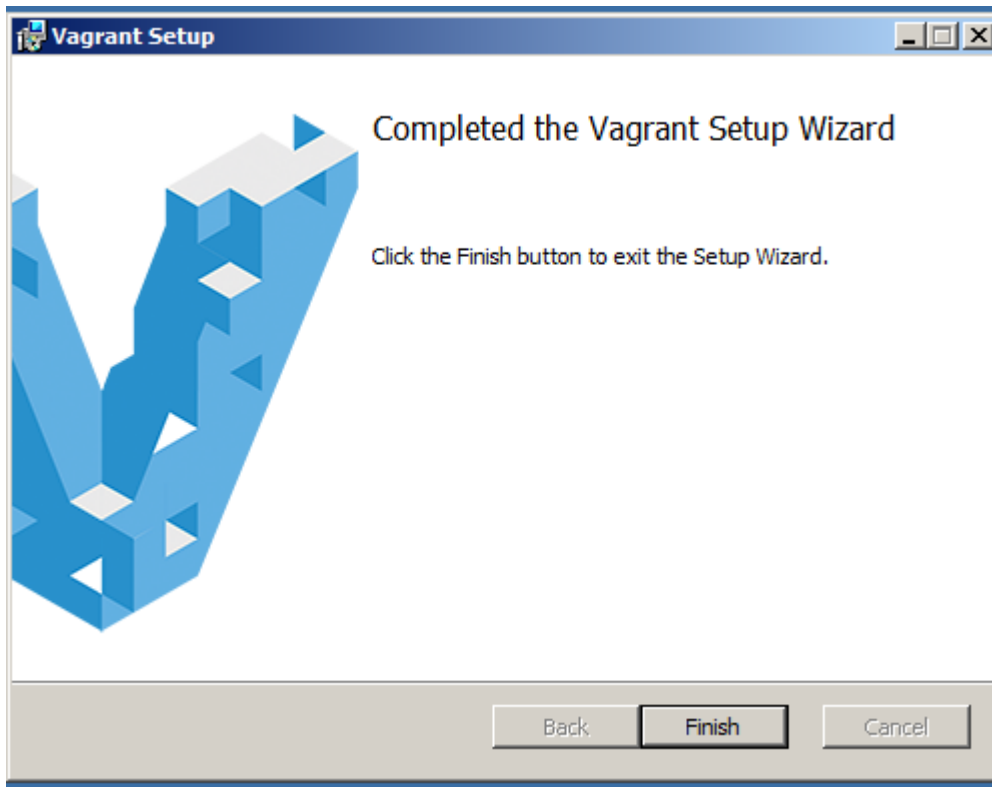
- https://dl.bintray.com/mitchellh/vagrant/vagrant_1.5.4.msi

5.2 Installing VirtualBox

To install VirtualBox:

1. Run the downloaded installer program.
2. Follow the prompts. Accept all of the default option settings.
3. Once installed, reboot your computer.

The Vagrant installer updated the path system variable with the location of the program.



6. Install cURL for Windows

6.1 Background

cURL for Windows is a command line tool and library for transferring data and downloading software using URL syntax.

This tool will be used to download the Vagrant script file that you will use to install the bulk of the edX environment.

The homepage for Confused by Code is here: <http://www.confusedbycode.com/>

We will use version curl-7.40.0-win64.

You can find the curl version you need for 64-bit Windows here:

- cURL for Windows web page - <http://www.confusedbycode.com/curl/>
- cURL for Windows direct download link - <http://www.confusedbycode.com/curl/curl-7.40.0-win64.msi>

6.2 Installing cURL

1. Run the downloaded installer.
2. Follow the prompts.
3. Once installed, reboot your computer.

7. Install edX

7.1 Background

The edX platform is based on a wide variety of software components.

Each component must be of the right (compatible) version, and must be configured to work well with the other components.

To help ensure that all the software has been installed and configured as required, installation, provisioning, and configuration software from Vagrant and Ansible has been used.

A script written in the Vagrant scripting language will be used, which will call other programs, including Ansible scripts.

This makes it possible for a person to install the base edX platform with just a few commands.

7.2 Prerequisites

To install Open edX using the Vagrant script, the following software must have already been installed:

1. Windows 7 Enterprise, with Services for NFS enabled.
2. Oracle VirtualBox 4.3.16 and its extension pack.
3. Vagrant 1.5.4
4. cURL version 7.40.0

7.3 Installing the edX Platform

The edX Platform is packaged in a VirtualBox image or “box”.

For the purposes of these instructions, we will install the birch release of edX.

The size of the box for the birch release is approximately 2.8GB. It will take a while to download.

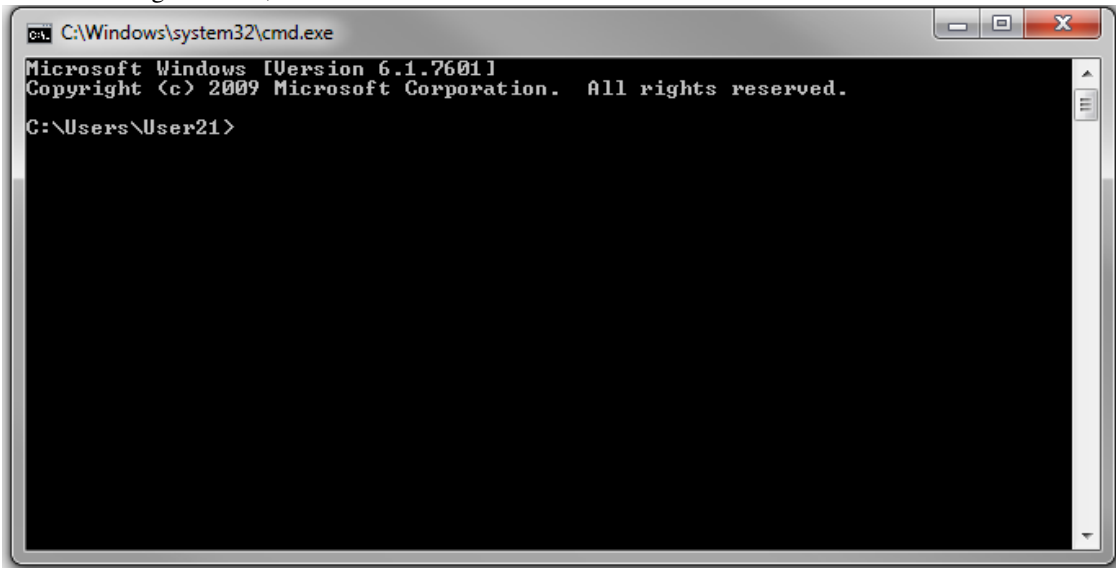
The Vagrant installation script will download the box, create a VirtualBox virtual machine instance with Ubuntu as the operating system, and then install and configure all the code it needs into Ubuntu within that virtual machine.

We will install the edX Platform by running the Vagrant script from the command line.

All you have to do is create the directory from which you would like to run edX, and run the Vagrant script.

So, let “edx_birch” will be the name of the directory. You can, however, use any name you like.

1. **Open a command line session with Administrator Rights, by Clicking the Start Button, Accessories, and Command Prom**
Right click it, and select Run as Administrator.



2. **Create a directory for edX:** `md edx_birch`
3. **Make that directory the current directory:** `cd edx_birch`
4. **Download the Vagrant script file, using the cURL programs, by copy and pasting curl line below into the command prom**
`curl -L https://raw.githubusercontent.com/edx/configuration/master/vagrant/release/fullstack/Vagrantfile`
`> Vagrantfile`

Note: The Vagrantfile you will download with the previous command will default to installing the kifli version of edX, not the birch version.

To install the birch release:

- (a) **Create an *OPENEDX_RELEASE* environment variable in Windows**
 - Create the Windows environment variable: `OPENEDX_RELEASE="named-release/birch"`

To do so:

- i. Click the Start button, right click My Computer and select Properties.
 - ii. Click the Advanced Systems Settings option on the panel on the left.
 - iii. Click the Environment Variables button.
 - iv. In the System Variables List, at the bottom half of the window, click the New... button.
 - v. Enter as the Variable Name: OPENEDX_RELEASE
 - vi. Enter as the Variable Value: named-release/birch
 - vii. Click OK to save the new system variable.
 - viii. Reboot the computer immediately.
- (b) Modify the newly downloaded Vagrantfile, replacing the default reference with a reference to the named-release/birch version.

5. **Install the Vagrant hostsupdater plugin:** `vagrant plugin install vagrant-hostsupdater`

6. **Create the Fullstack virtual machine, by having Vagrant run the script:** `vagrant up`

7. Reboot the computer.

5. Starting & Stopping edX

8.1 Background

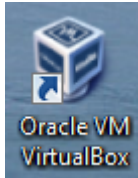
The edX platform will run under a virtual machine environment.

The platform runs under the Ubuntu operating system.

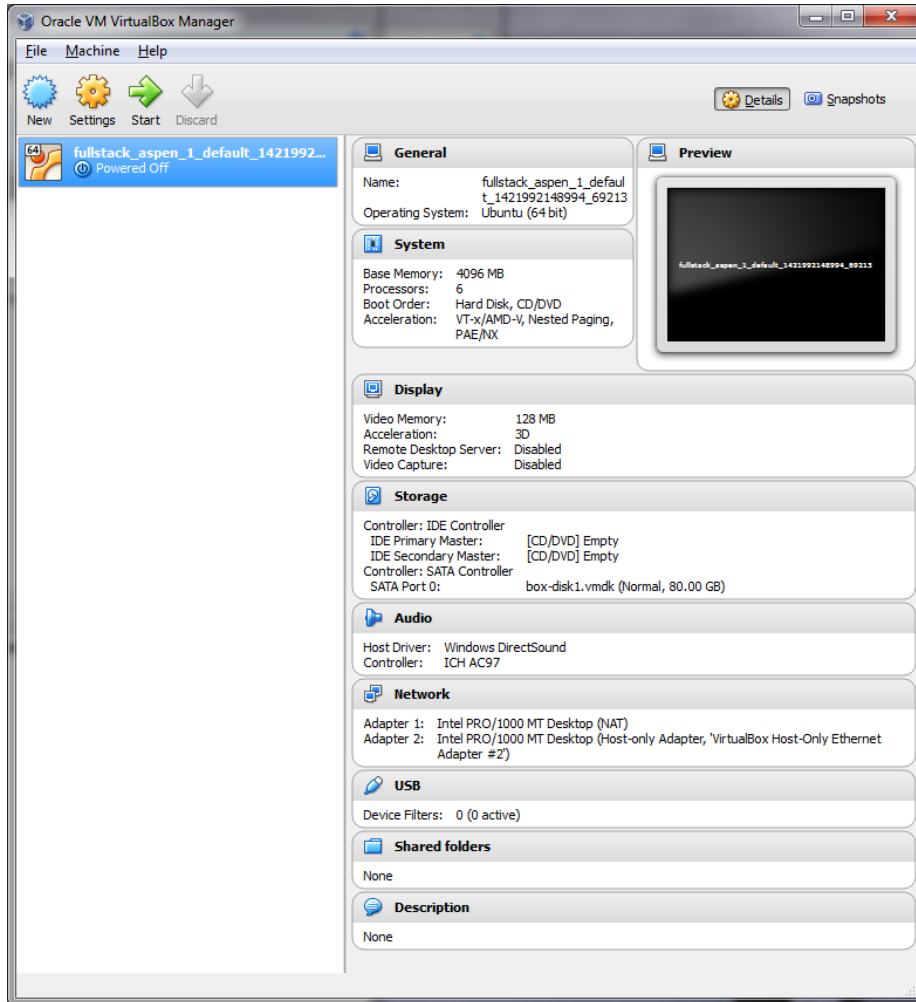
Once the platform has been installed, you can start it using VirtualBox.

8.2 Starting edX

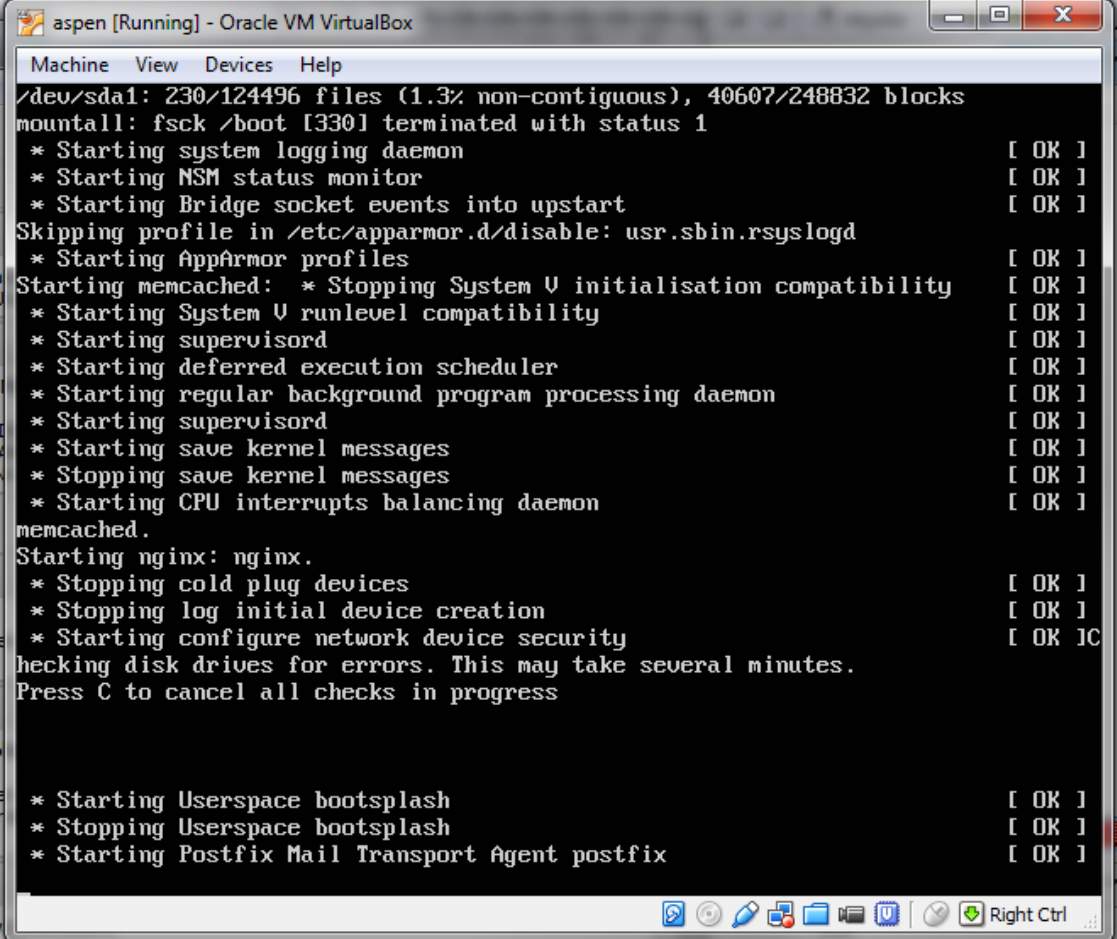
1. Load the VirtualBox program by clicking it on the Start Menu or double clicking its program icon.



2. Click the Aspen entry on the lefthand side, and then click the Start button on the toolbar.



3. The virtual machine will start in a command window. Commands will execute there.

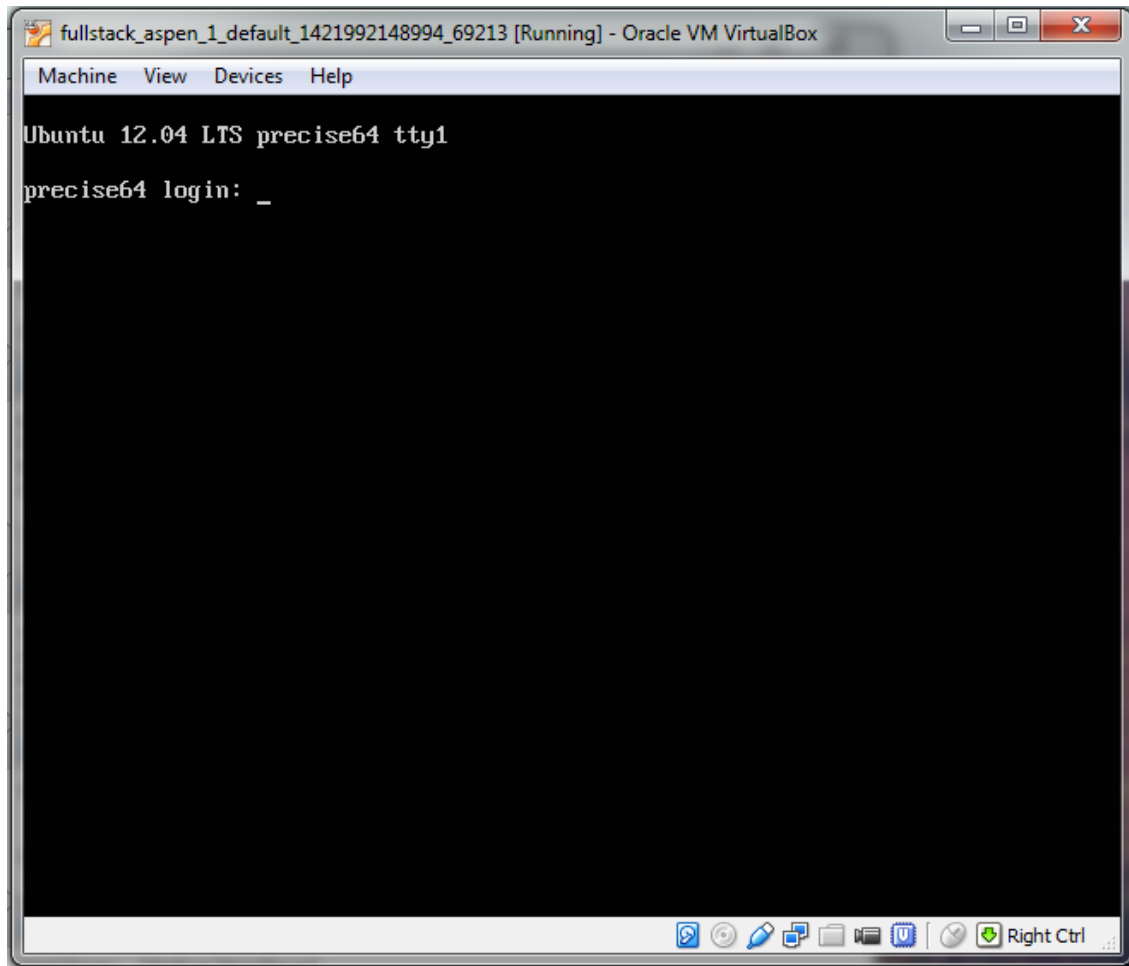


The screenshot shows a terminal window titled "aspens [Running] - Oracle VM VirtualBox". The terminal output displays the following system boot logs:

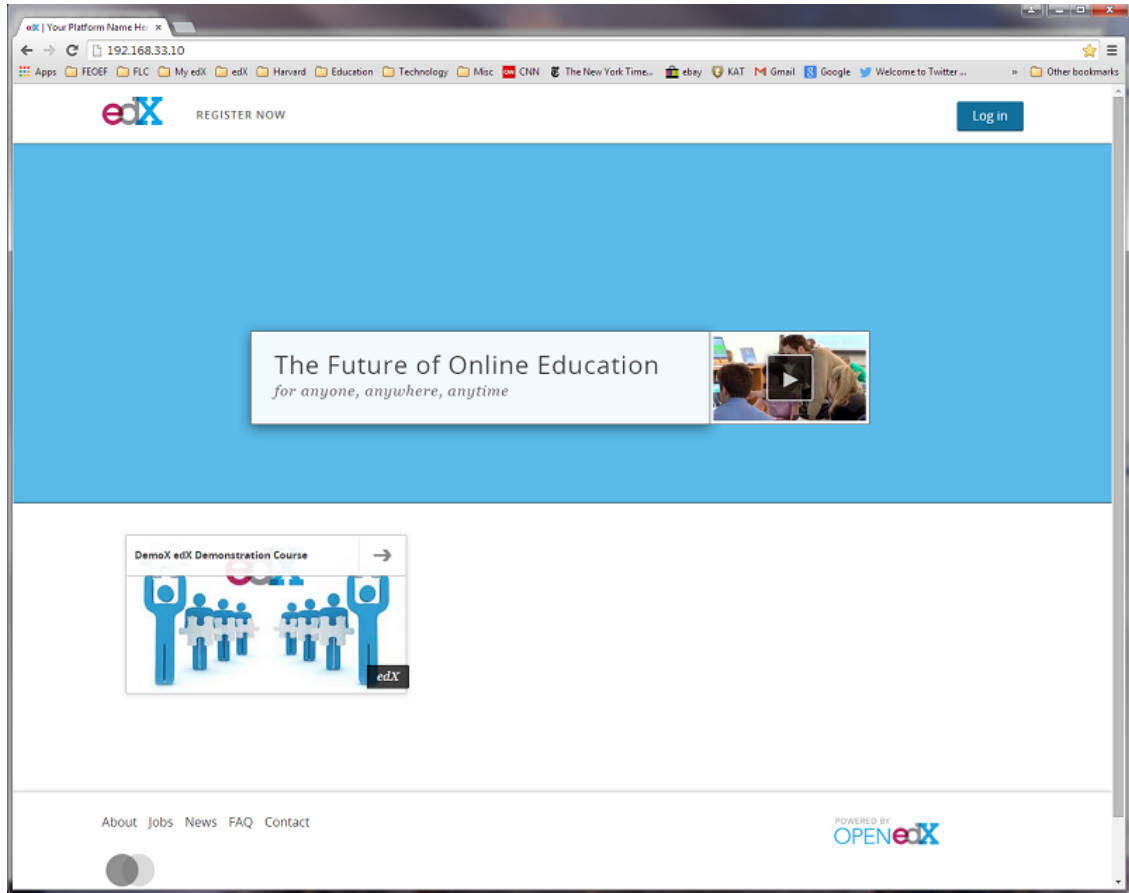
```
Machine View Devices Help
/dev/sda1: 230/124496 files (1.3% non-contiguous), 40607/248832 blocks
mountall: fsck /boot [330] terminated with status 1
* Starting system logging daemon [ OK ]
* Starting NSM status monitor [ OK ]
* Starting Bridge socket events into upstart [ OK ]
Skipping profile in /etc/apparmor.d/disable: usr.sbin.rsyslogd
* Starting AppArmor profiles [ OK ]
Starting memcached: * Stopping System V initialisation compatibility [ OK ]
* Starting System V runlevel compatibility [ OK ]
* Starting supervisord [ OK ]
* Starting deferred execution scheduler [ OK ]
* Starting regular background program processing daemon [ OK ]
* Starting supervisord [ OK ]
* Starting save kernel messages [ OK ]
* Stopping save kernel messages [ OK ]
* Starting CPU interrupts balancing daemon [ OK ]
memcached.
Starting nginx: nginx.
* Stopping cold plug devices [ OK ]
* Stopping log initial device creation [ OK ]
* Starting configure network device security [ OK ]
Checking disk drives for errors. This may take several minutes.
Press C to cancel all checks in progress

* Starting Userspace bootsplash [ OK ]
* Stopping Userspace bootsplash [ OK ]
* Starting Postfix Mail Transport Agent postfix [ OK ]
```

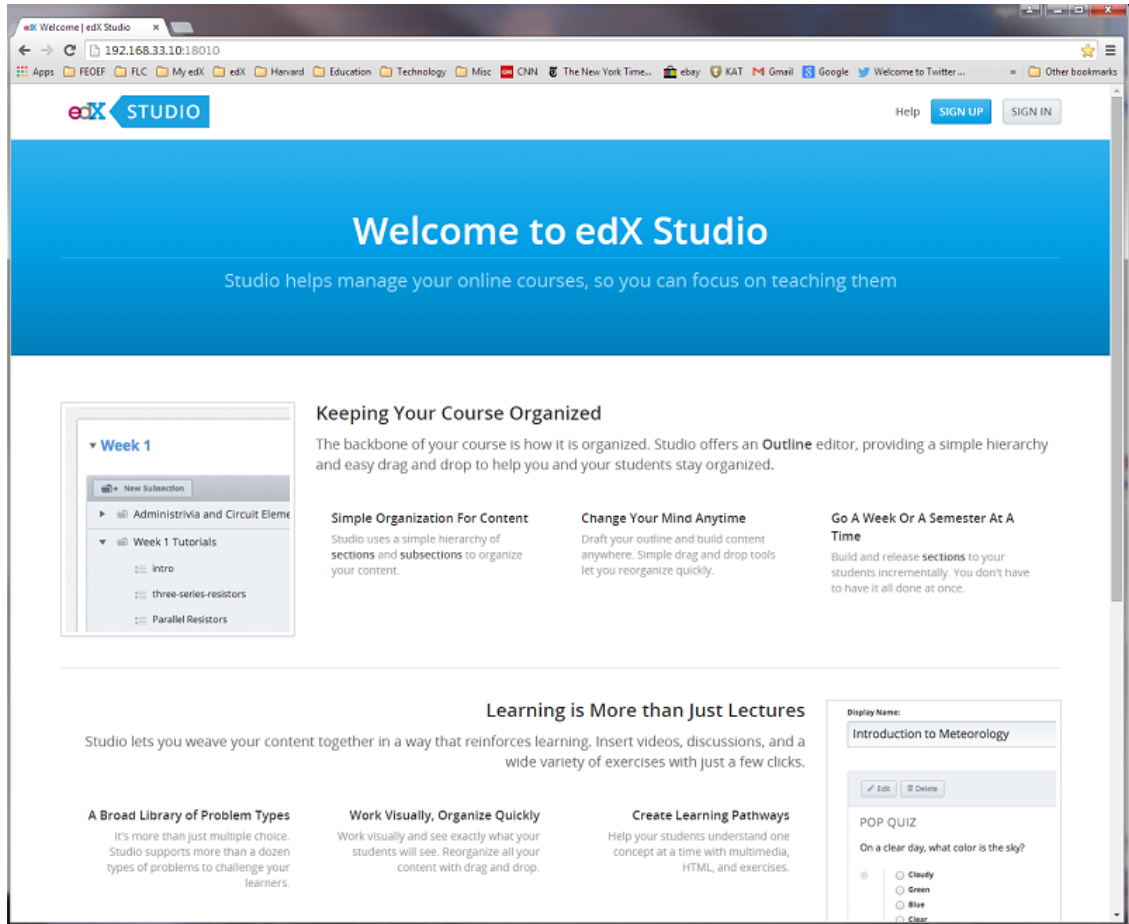
4. A login screen will display while edX loads, in 30 secs or so. You do not need to login.



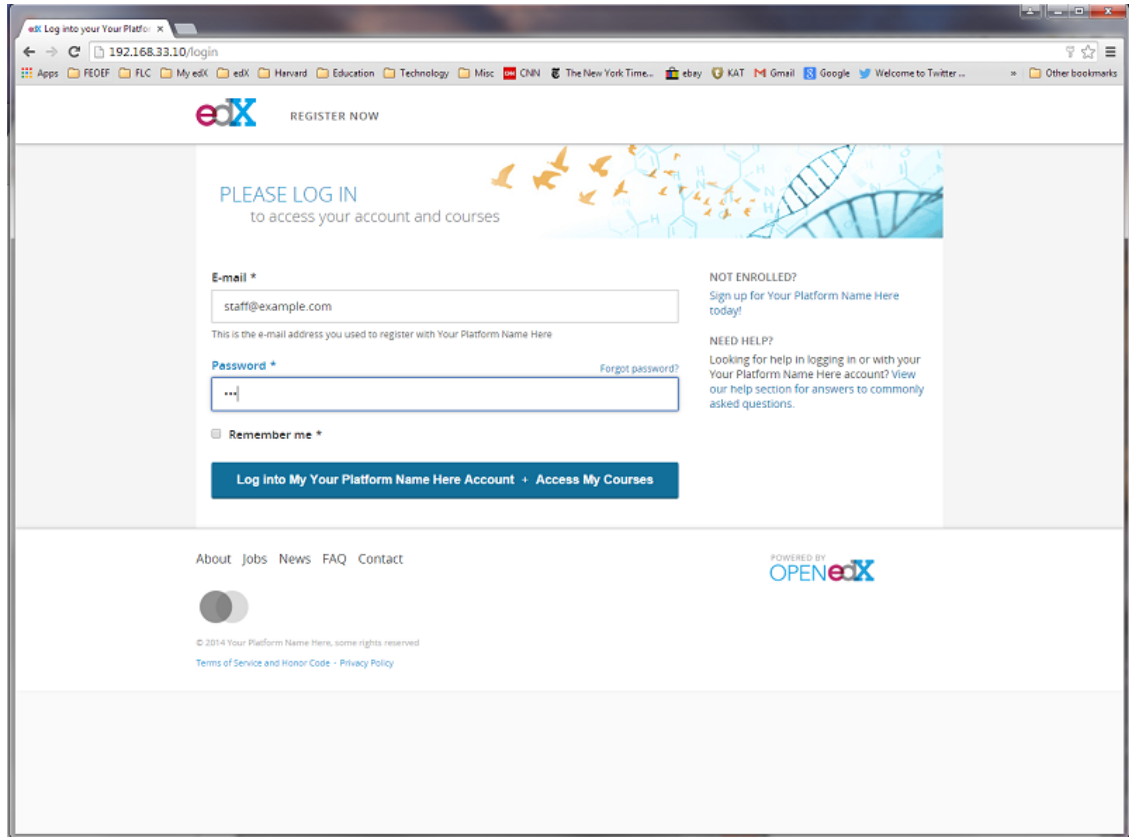
5. Load the Learning Management System by entering 192.168.33.10 into a browser in Windows.



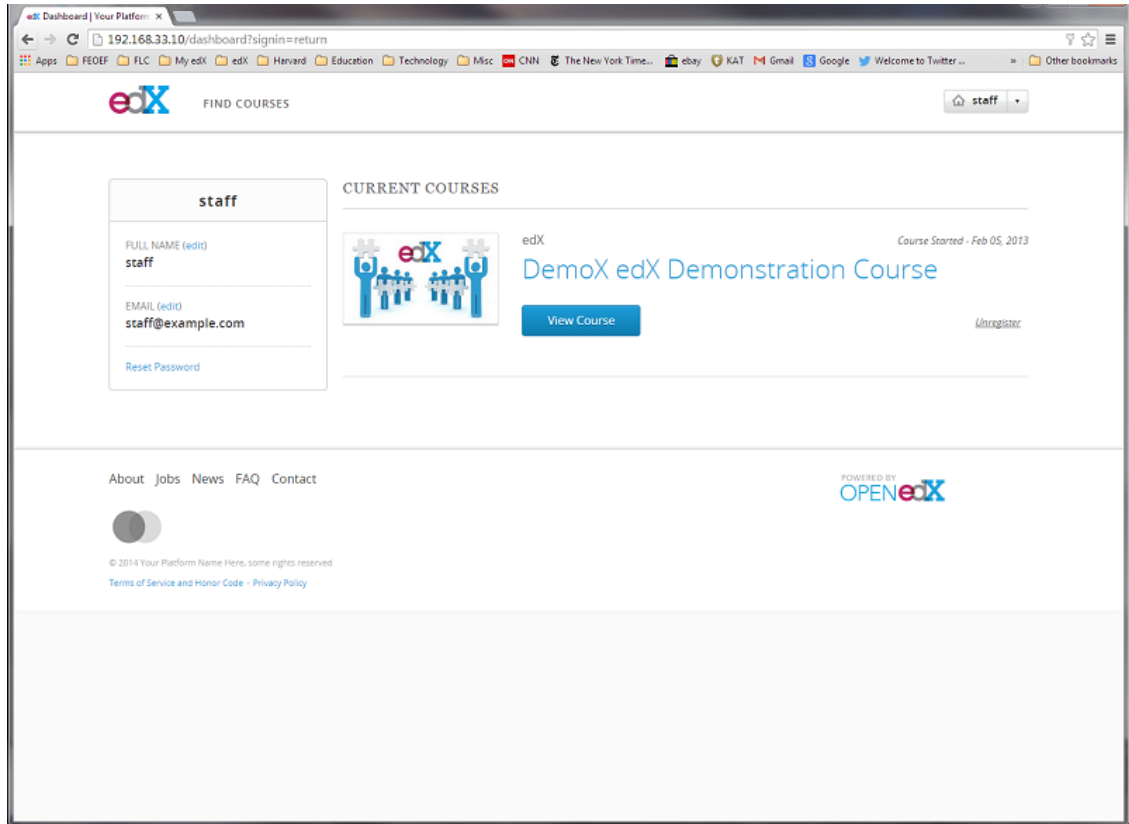
6. Load the edX Content Management System (CMS) by entering 192.168.33.10:18010 into a browser:



7. Login using a pre-built user account: ID: `staff@example.com` Password: `edx`

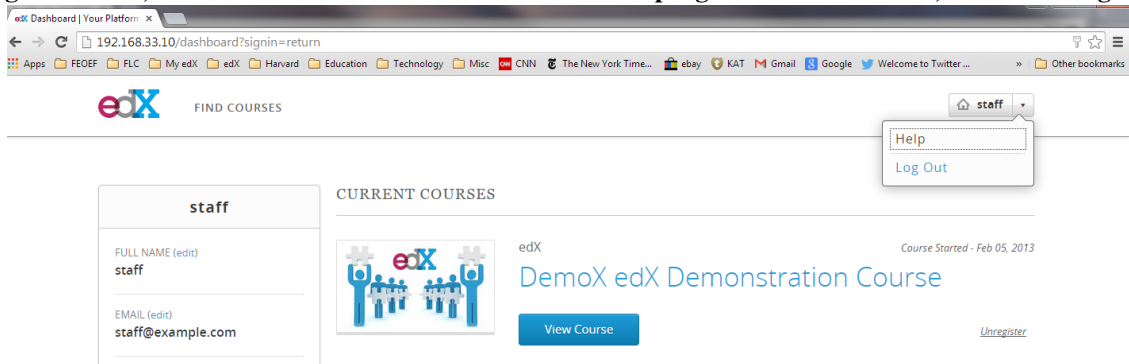


8. You are now logged into edX and your Dashboard of registered courses is displayed.

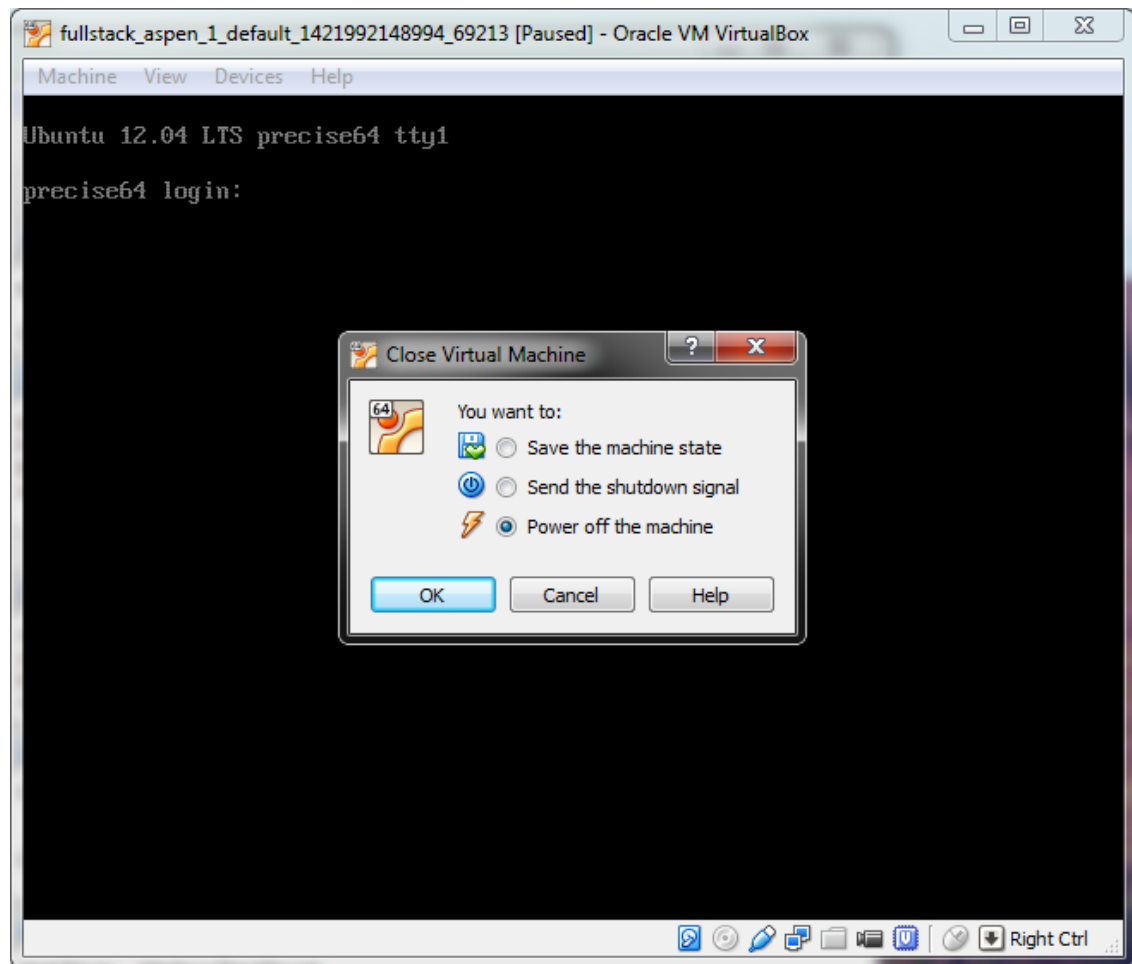


8.3 Stopping edX

1. To log out of edX, **CLICK** the Staff or Student button at the top right of the Dashboard, and select **Log Out**.



2. To close the virtual machine, click the standard Close Window X icon at the top right of the window in which Ubuntu is running.



3. Select the Power Off the machine, option and press CLICK the OK button. The window will close and the virtual machine will be unloaded.

9. Install Utilities

Several additional utility programs will make working with Open edX much easier.

10. Configure Email System

This section describes how to install and configure the email system.

- Installing the Mail System

11. Install Custom Theming

It is possible to customize the look-and-feel of your instance of Open edX, though it might not be as simple and straightforward as some might like.

The team at edX.org says that they plan to provide a more straightforward means of doing so at some point in the future.

Meanwhile, the theme known as the “Stanford-Online edX Theme” is available, and is said to provide some facility whereby one can more easily customize the learning management system (LMS) of Open edX.

The content management system (CMS) Studio look-and-feel will not be affected by this customization.

11.1 The Process

1. Log into the Ubuntu instance, using the vagrant User ID (the ID and password are each vagrant).
2. Modify the `lms.env.json` file that can be found in the `/edx/app/edxapp` directory. You can do so with the character-based editor nano, using the following command:

```
sudo nano /edx/app/edxapp/lms.env.json
```
3. In the json file, change “`USE_CUSTOM_THEME`”: `false` to “`USE_CUSTOM_THEME`”: `true`
4. Also change “`THEME_NAME`”: “” to “`THEME_NAME`”: “`default`”
5. Save the file, using CTRL O.
6. Close the file using CTRL X.

7. Become the `edxapp` user, by executing the following line:

```
sudo su edxapp -s /bin/bash
```

8. Execute the following lines:

```
cd ~
```

```
source edxapp_env
```

9. Create a directory for the theme and then download the Stanford theme from github into that directory:

```
mkdir themes
```

```
cd themes
```

```
git clone https://github.com/Stanford-Online/edx-theme.git default
```

10. Recompile the edX assets:

```
cd /edx/app/edxapp/edx-platform
```

```
paver update_assets lms - -settings=aws
```

NB. The above command has two “-” in front of settings, with no space between the two dashes.

Upon successfully completing the above steps, you will see the Stanford Theme upon restarting the web server.

Indices and tables

- `genindex`
- `modindex`
- `search`