



**Developing Technology Professionals**

[www.netdevgroup.com](http://www.netdevgroup.com)

# Learning Linux! Labs and more labs!

**Speaker name: Richard Weeks**

**Title : President**

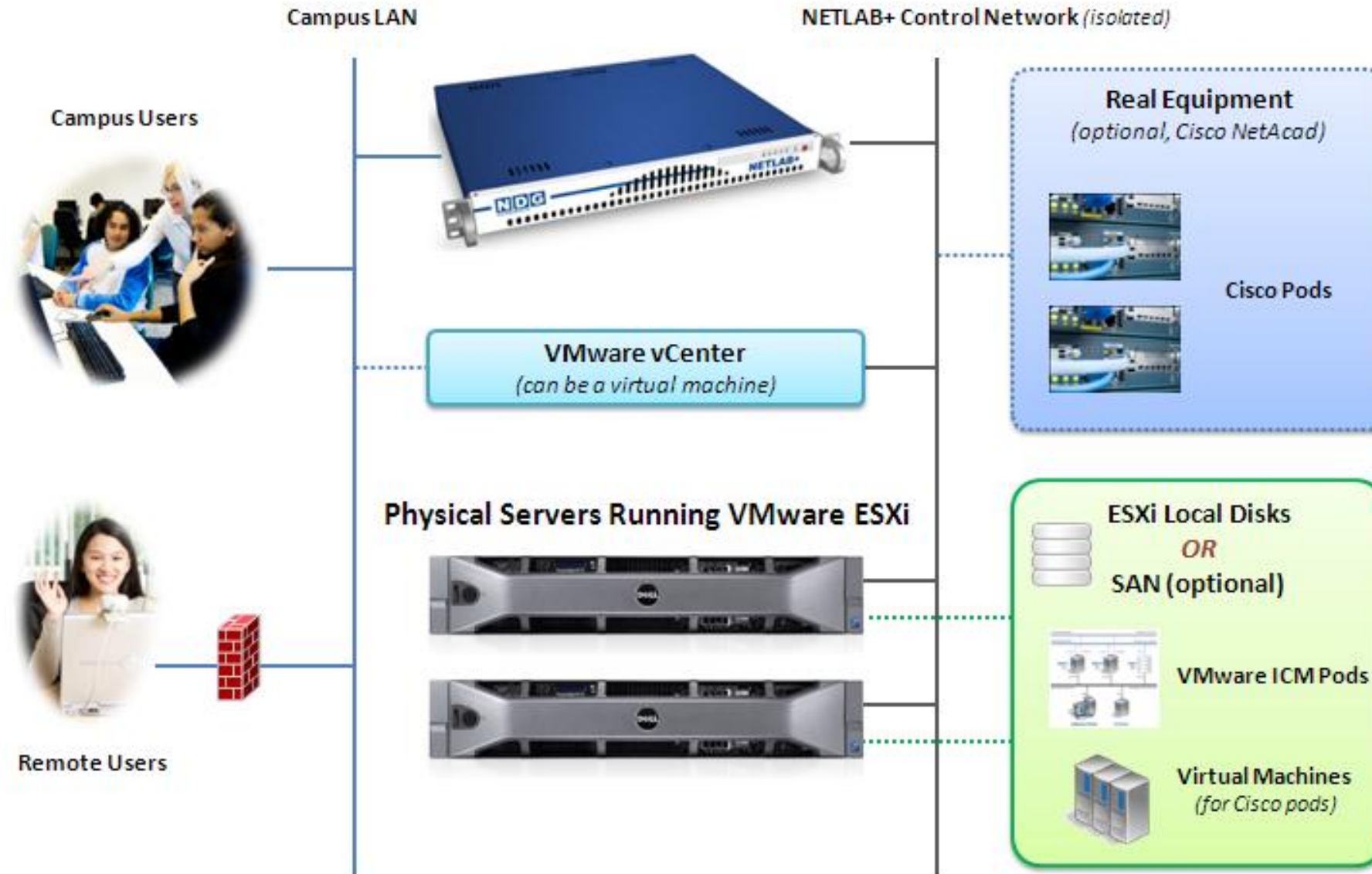
**Date : 7/26/16**

# Who is NDG? [www.netdevgroup.com](http://www.netdevgroup.com)

- Focus: Serving others by helping with job skills
- Mission: Help academic institutions teach IT
- Develop instructional content aligned to jobs
- Working with academia 15+ years



# Product 1: NETLAB+ to host real equipment



# NETLAB+ software to automate lab use

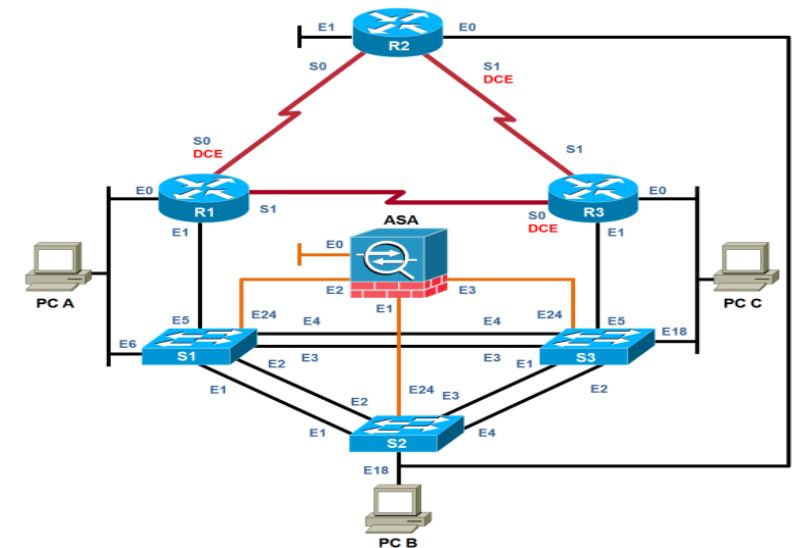
**NDG** **NETLAB+**  
Scheduler  
MyNETLAB Logout rlucas

March 2011  
Su Mo Tu We Th Fr Sa  
1 2 3 4 5  
6 7 8 9 10 11 12  
13 14 15 16 17 18 19  
20 21 22 23 24 25 26  
27 28 29 30 31

Now Showing (Today) **March 16** Wednesday  
Eastern Time (US & Canada)

Time	vmware ICM POD	vmware ICM POD	vmware ICM POD	STANDALONE COMPUTER POD
7am - 8am	POD 10	N3DEV Host 38 ICM Master Pod	POD 1018	BackTrack Pod1
8am - 9am				Reservation 968 Test
9am - 10am				
10am - 11am				
11am - 12pm				
12pm - 1pm				
1pm - 2pm	Reservation 973 Test, Team B			Reservation 970 Test
2pm - 3pm			Reservation 971 Test	

## Time share equipment



# NETLAB+ enables hands-on lab



- NETLAB+ product to host lab equipment
- 130,000+ virtual machines worldwide
- 8,500+ Cisco devices worldwide
- Developed cloud platform to host labs
- Hosting Linux courses for learners

# Product 2: Cloud platform for “learn by doing”

## Example: Online Linux courses and content

Content

Objectives

Key Terms

### 3.6 head Command

The purpose of the `head` command is to view the beginning of a file or output. By default, the `head` command will display the first ten lines of a file's contents. For example, the following command displays the first ten lines of the `alpha.txt` file:

```
sysadmin@localhost:~/test$ head alpha.txt
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C is for Cat
D is for Dog
E is for Elephant
F is for Flower
G is for Grapes
H is for Happy
I is for Ink
J is for Juice
```

There are several options for the `head` command that are useful. For instance, there is the ability to use a number as an option to indicate how many lines of output to display. For example, to display the first three lines of the `alpha.txt` file execute:

```
sysadmin@localhost:~/test$ head -3 alpha.txt
A is for Apple
B is for Bear
C is for Cat
```

There is also an option, `-n`, which takes an argument for the number of lines to display. So, the

>\_ Ubuntu PC ▾

```
sysadmin@localhost:~/test$
```

Linux? Why should learners care?

# Linux is part of daily life...

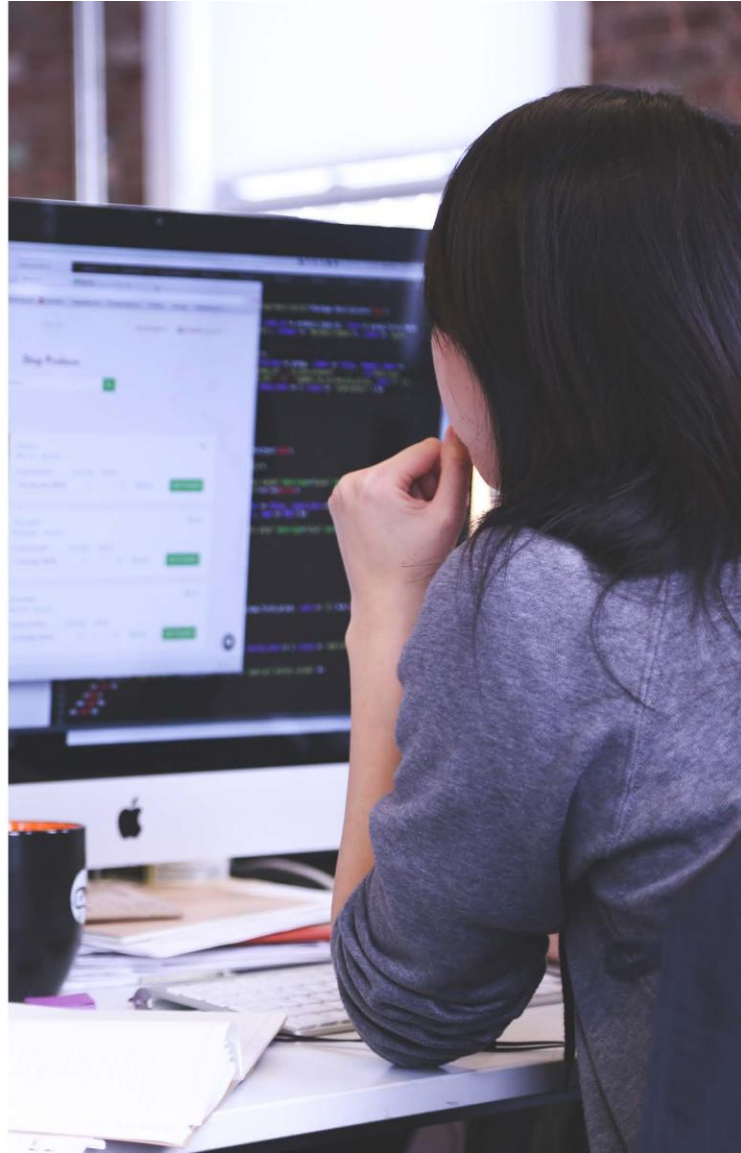




# Linux is important base knowledge for IT pros



Linux is a  
core skill



- Big Data
- Cloud Computing
- Cyber Security
- Networking
- Software developers



# SpaceX wants Linux Professionals

“SpaceX is looking for **Software Engineers** ... for our Falcon 9 rocket and Dragon space craft.... We do a majority of our work in C++ on a **custom Linux platform** using a Power PC chip architecture.”

Requirements:

BS or MS or PhD in Computer Science  
or related field of study

**Extensive knowledge of Linux system programming**

Linux skills are in demand: [www.Indeed.com](http://www.Indeed.com)

Job skill key word	Numbers
Linux	60,635
Cyber Security	35,838
CompTIA A+	15,239
Cisco CCNA	8,671
VMware	19,950
Storage	159,476

# NDG Linux Courses

# Content with virtual machine for “learn by doing”

Content

Objectives

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>\_ Ubuntu PC

```
sysadmin@localhost:~/test$
```

# Available to Cisco Networking Academy

Grace Sign Out English My NetAcad


 Cisco Networking Academy Courses Careers Get Started About Us

Home / Courses / NDG Introduction to Linux

NDG Introduction to Linux

Learn basic Linux system administration skills and prepare for LPI LPIC-1 or CompTIA Linux+ powered by LPI certification.

Enroll Now



■ ■ ■ Intermediate Duration: 140 hours Fee: \$39.95 Self-paced / Instructor-led

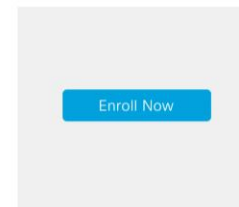
## Course Summary

Developed by: [NDG](#)

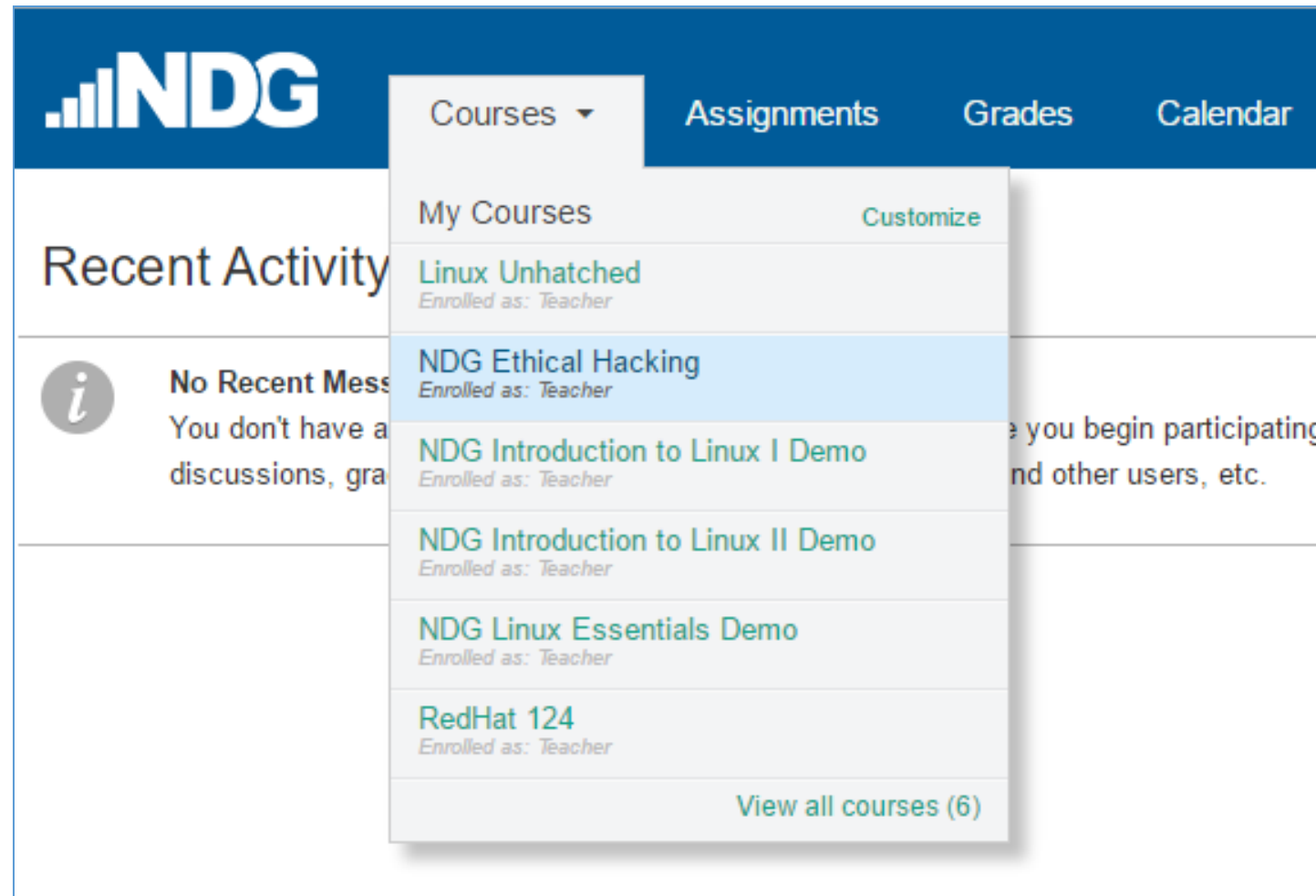
**NDG Introduction to Linux** is a 2-course series for aspiring Linux system administrators. Develop proficiency in performing maintenance tasks on the command line, installing and configuring a computer running Linux, and configuring basic networking, using virtual machines running Linux.

- Introduction to Linux I, 70 hours, prepares you for certification Exam 101 and covers: system architecture, Linux installation and package management, GNU and UNIX commands, devices, Linux file systems, and file system hierarchy standards.
- Introduction to Linux II, 70 hours, prepares you for certification Exam 102 and covers: shells, scripting and data management, interfaces and desktops, administrative tasks, essential system services, networking fundamentals, and security.
- Develop a working knowledge of the Linux command line.
- Study with an instructor in the classroom or at your own pace. Access expert content online anytime.
- Get immediate feedback on your knowledge through built-in quizzes and tests.
- Connect with the global Cisco Networking Academy community.

Languages: English



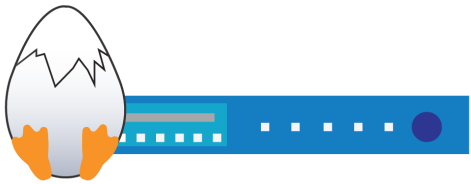
NDG can host too if needed. Prefer Cisco use...



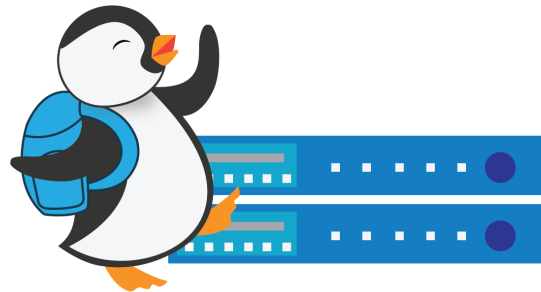
The screenshot displays the NDG (Network Defense Gateway) user interface. At the top, there is a dark blue header with the NDG logo on the left and navigation tabs for 'Courses', 'Assignments', 'Grades', and 'Calendar' on the right. Below the header, the main content area is divided into sections. On the left, there is a 'Recent Activity' section with an information icon and a message: 'No Recent Messages. You don't have any discussions, grades, or assignments yet. Once you begin participating with other users, etc.' On the right, there is a 'My Courses' section with a 'Customize' link. Below this, a dropdown menu is open, listing several courses: 'Linux Unhatched', 'NDG Ethical Hacking', 'NDG Introduction to Linux I Demo', 'NDG Introduction to Linux II Demo', 'NDG Linux Essentials Demo', and 'RedHat 124'. Each course entry includes the text 'Enrolled as: Teacher'. At the bottom of the dropdown menu, there is a link that says 'View all courses (6)'.

Course Name	Enrollment Status
Linux Unhatched	Enrolled as: Teacher
NDG Ethical Hacking	Enrolled as: Teacher
NDG Introduction to Linux I Demo	Enrolled as: Teacher
NDG Introduction to Linux II Demo	Enrolled as: Teacher
NDG Linux Essentials Demo	Enrolled as: Teacher
RedHat 124	Enrolled as: Teacher

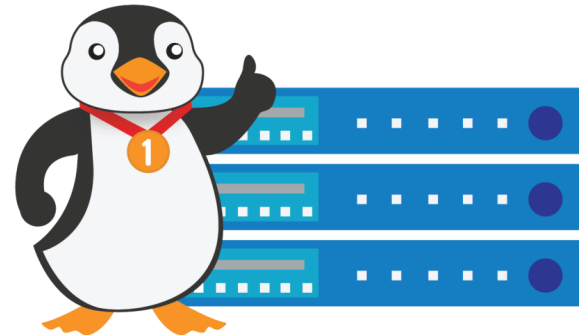
# Several content options to help learn and teach Linux



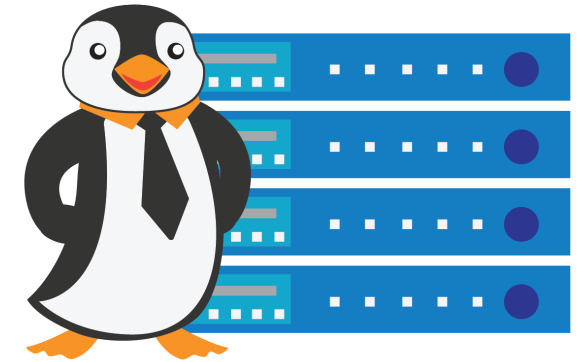
NDG Linux Unhatched



NDG Linux Essentials



NDG Linux 1



NDG Linux 2



# Economical

Course Title		Cost to Instructors	Cost to ILT Students	Cost to Self Paced Students
NDG Linux Unhatched		<b>FREE</b>	<b>FREE</b>	<b>FREE</b>
NDG Linux Essentials		<b>FREE</b>	<b>FREE</b>	<b>FREE</b>
NDG Linux I		<b>FREE</b>	\$39.95*	\$39.95*
NDG Linux II		<b>FREE</b>	\$39.95*	\$39.95*

# NDG Linux Courses

# NDG Linux Unhatched

- Covers the basic Linux A+ certification
- Beta version ready for use
- NDG is releasing a new version in August 2016
- Available for learners: Cisco Networking Academy IT Essentials
- Available via the internet from NDG

[netdevgroup.com/try/unhatched](http://netdevgroup.com/try/unhatched)



# Free module being built by NDG to teach basics of Linux aligned to A+ certification.



Content

Objectives

## Printing Working Directory

The `pwd` command prints the working directory, which is the current directory used by the shell:

```
pwd [OPTIONS]
```

```
sysadmin@localhost:~$ pwd  
/home/sysadmin
```

After using the `cd` command to change directories, the `pwd` command can be used to verify the change.

```
sysadmin@localhost:~$ cd /etc/calendar  
sysadmin@localhost:/etc/calendar$ pwd  
/etc/calendar
```

Notice our virtual machines employ a prompt that displays the current working directory, emphasized with the color blue. In the first example, you can see that `~` is equivalent to `/home/sysadmin`, as it represents the user's home directory.

◀ Previous

Next ▶

>\_ Ubuntu PC

```
* Starting domain name service... bind9 [ OK ]  
Welcome to Ubuntu 14.04 LTS (GNU/Linux 3.13.0-79-generic x86_64)  
  
* Documentation: https://help.ubuntu.com/  
  
The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by  
applicable law.  
  
This lab has two user accounts (username :: password )  
  
root      :: netlab123  
sysadmin  :: netlab123  
  
Press the [Enter] key to begin...
```

# Ready for use: Cisco Networking Academy Content is Available in IT Essentials Course



IT Essentials

**Chapter 10**  
Mobile, Linux, and OS X Operating Systems

**10.4**  
Linux and OS X Operating Systems

**10.4.1**  
Linux and OS X Tools and Features

**10.4.1.3**  
Overview of Linux and OS X CLI

**Unix High Level Diagram**

**Note:** To experience a Linux command line interface in your web browser, return to class and visit the NDG Linux CompTIA A+ supplemental module.

**Linux and OS X File Systems**

Linux and OS X have unique file systems.

The commonly used file systems in Linux are ext3 and ext4 (third and fourth extended file system). They are journaled file systems that keep journals, or logs, of all the changes about to be made to the file system. These journals minimize the risk of file system corruption in the event of a sudden power loss because the journals can be used to apply the changes after power is restored. Both filesystems can support large file sizes up to 32 TiB (tebibytes) for ext4.

HFS+ (Hierarchical File System Plus) is the principle file system used by OS X. Like ext3 and ext4, HFS+ also supports journaled volumes. HFS+ volumes can support large file sizes up to almost 8 EiB (exbibyte) in OS X 10.4 and later.

1 2 3 Figures

Navigation icons: chat, bookmark, back, forward

**CISCO**

# Beta for Learners and Instructors to Trial

[www.netdevgroup.com/try/unhatched](http://www.netdevgroup.com/try/unhatched)



NDG ONLINE ▾

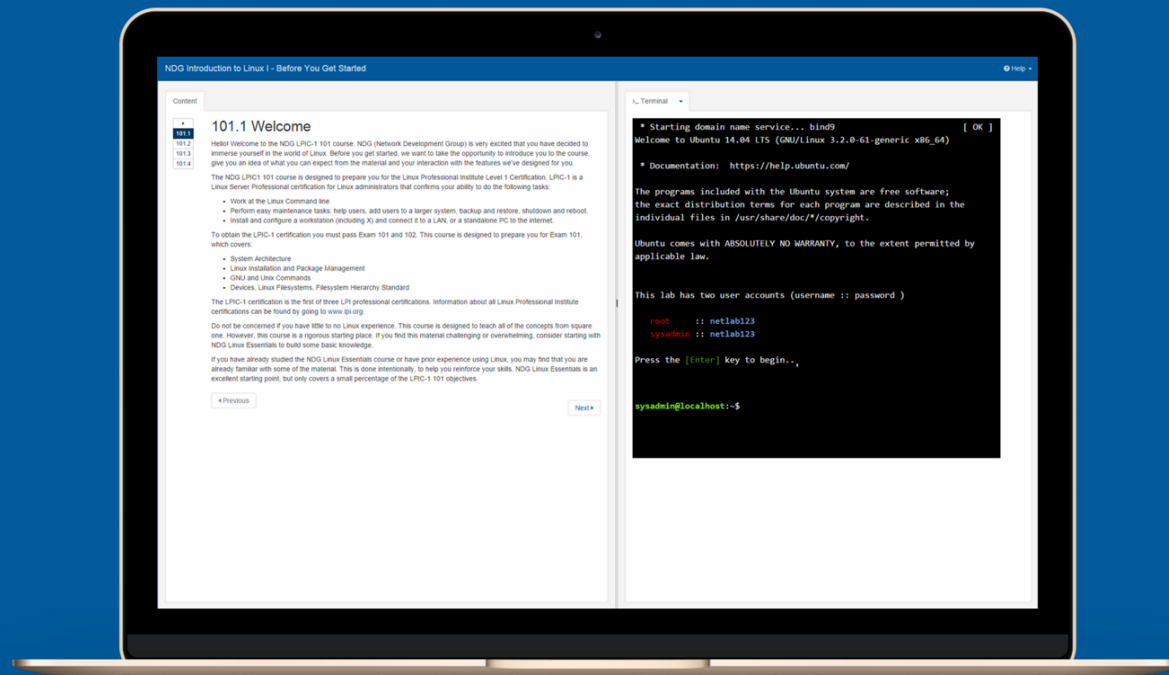
NETLAB+ ▾

SUPPORT ▾

NEWS ▾

CONTACT

## TRY LINUX UNHATCHED



First Name

Last Name

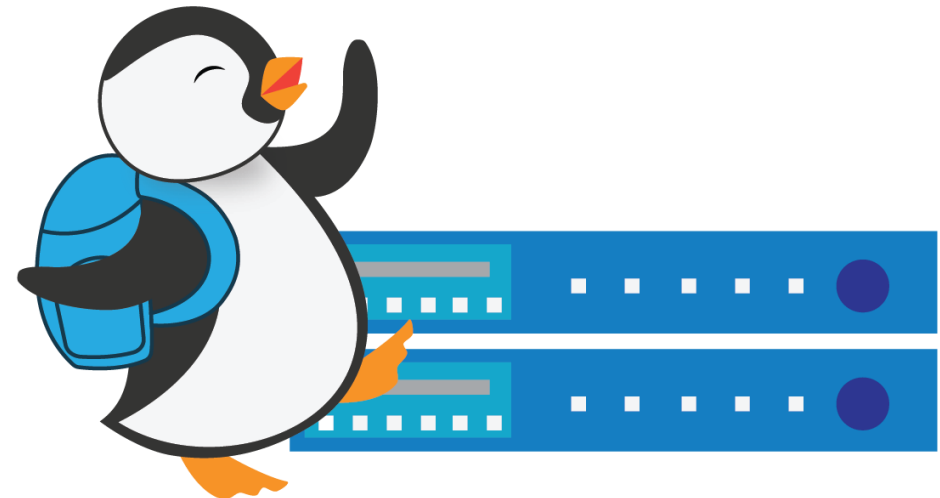
Email

I agree to the [terms of use](#) and acknowledge the [privacy policy](#).

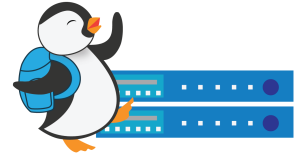
→ NEXT STEP

# NDG Linux Essentials

- Course designed to make the Linux CLI less intimidating
- Designed to be a Full Semester Course
  - With lectures, content, labs and assessments
- Sixteen (16) Chapters
- Thirteen (13) Lab Exercises
- Assessments
  - Chapter, Midterm and Final



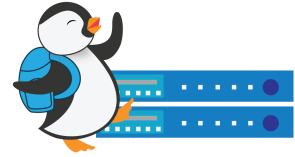
# NDG Linux Essentials Certificate Alignment



Title of Chapter	LPI Linux Essentials Certificate Objective Covered
1 Introduction to Linux	1.1 Linux Evolution and Popular Operating Systems
	4.1 Choosing an Operating System
2 Open Source Applications and Licenses	1.2 Major Open Source Applications
	1.3 Understanding Open Source Software and Licensing
3 Using Linux	1.4 ICT Skills and Working in Linux
4 Command Line Skills	2.1 Command Line Basics
5 Getting Help	2.2 Using the Command Line to Get Help
6 Working with Files and Directories	2.3 Using Directories and Listing Files
	2.4 Creating, Moving and Deleting Files
7 Archiving and Compression	3.1 Archiving Files on the Command Line

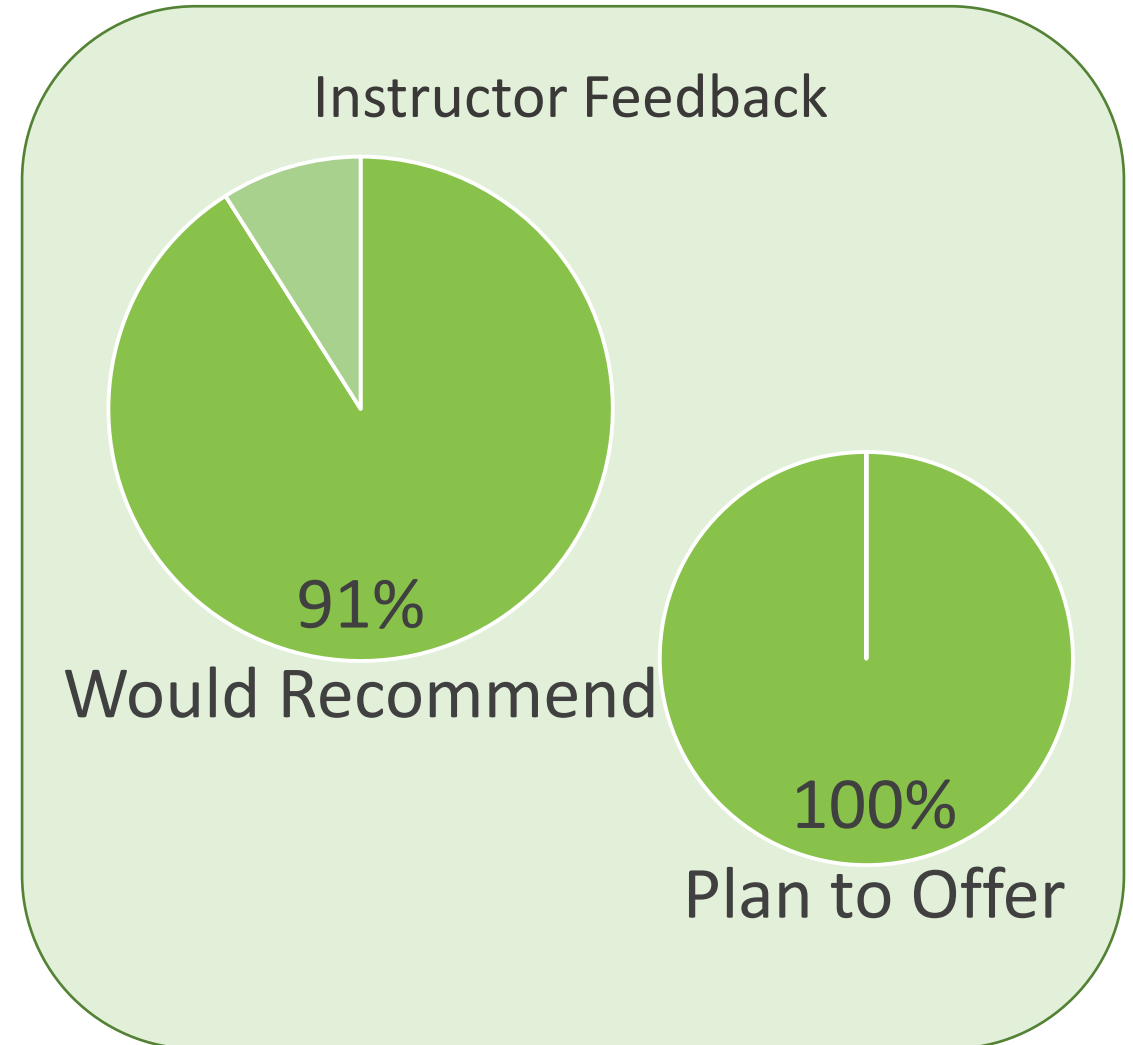
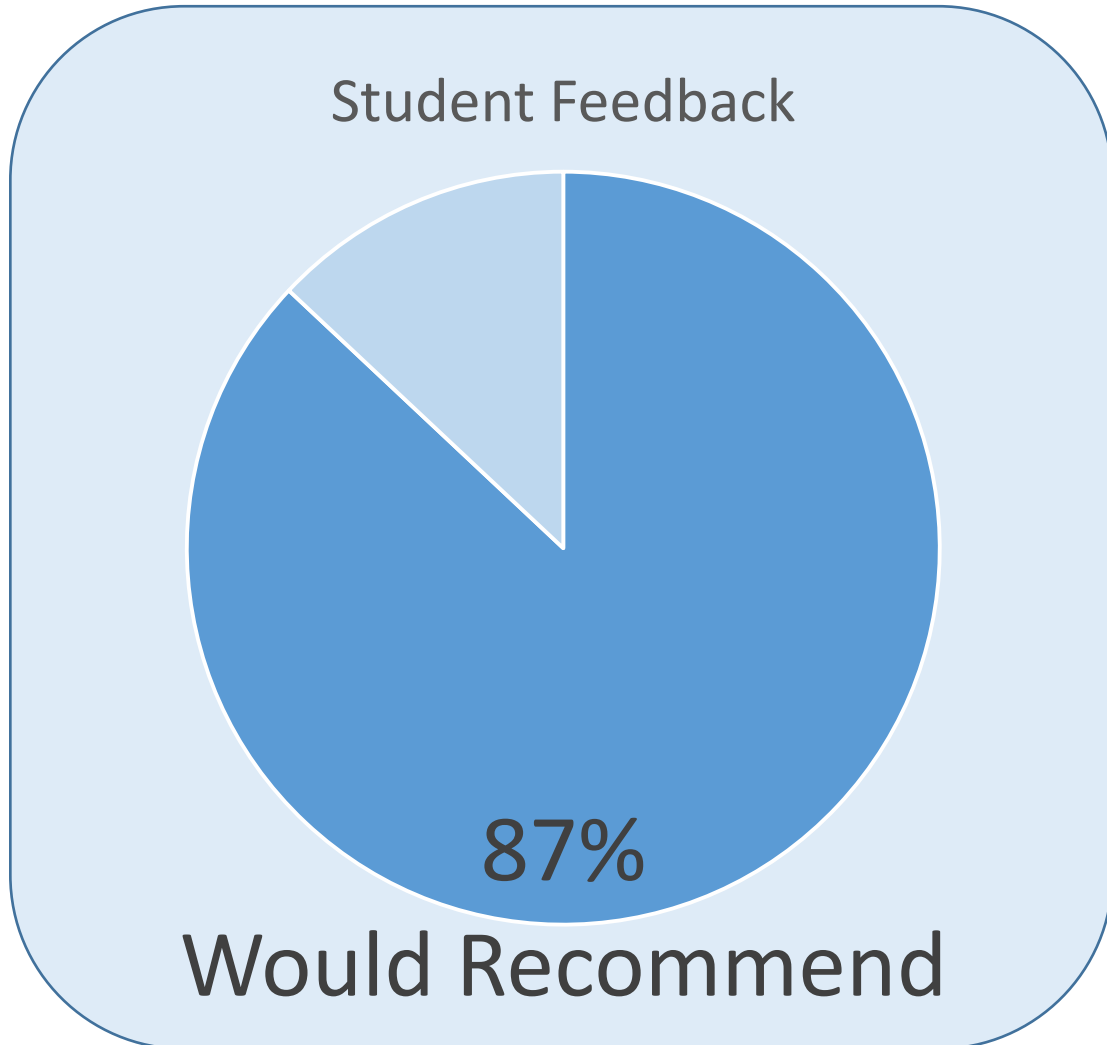
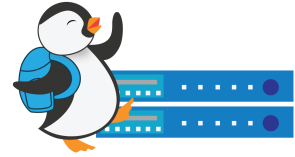


# NDG Linux Essentials Certificate Alignment



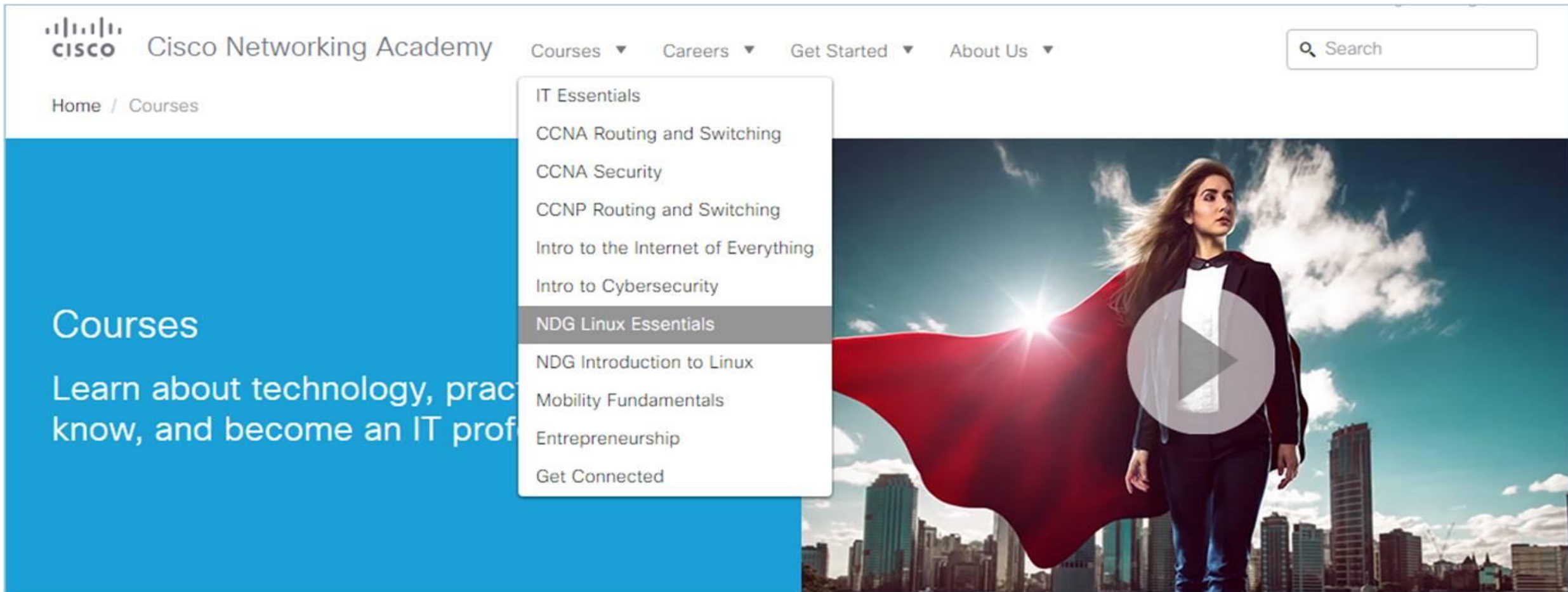
Title of Chapter	LPI Linux Essentials Certificate Objective Covered
8 Pipes, Redirection, and REGEX	3.2 Searching and Extracting Data from Files
9 Basic Scripting	3.3 Turning Commands into a Script
10 Understanding Computer Hardware	4.2 Understanding Computer Hardware
11 Managing Packages and Processes	4.3 Where Data is Stored
12 Network Configuration	4.4 Your Computer on the Network
13 System and User Security	5.1 Basic Security and Identifying User Types
14 Managing Users and Groups	5.2 Creating Users and Groups
15 Ownership and Permissions	5.3 Managing File Permissions and Ownership
16 Special Permissions, Links and File Locations	5.4 Special Directories and Files

# NDG Linux Essentials Course Feedback



# NDG Linux Essentials – Enroll Now

<http://www.netacad.com> Linux Essentials



The screenshot shows the Cisco Networking Academy website. The top navigation bar includes the Cisco logo, the text "Cisco Networking Academy", and menu items for "Courses", "Careers", "Get Started", and "About Us". A search bar is located on the right. Below the navigation bar, the breadcrumb "Home / Courses" is visible. The main content area features a blue sidebar with the heading "Courses" and the text "Learn about technology, practice what you know, and become an IT professional". The main content area is dominated by a large image of a woman in a business suit with a red cape, standing against a city skyline. A large play button icon is overlaid on the image. A dropdown menu is open under the "Courses" link, listing various courses, with "NDG Linux Essentials" highlighted in a grey bar.

Home / Courses

Courses

Learn about technology, practice what you know, and become an IT professional

IT Essentials

CCNA Routing and Switching

CCNA Security

CCNP Routing and Switching

Intro to the Internet of Everything

Intro to Cybersecurity

**NDG Linux Essentials**

NDG Introduction to Linux

Mobility Fundamentals

Entrepreneurship

Get Connected

# NDG Linux Essentials – Enroll Now [netacad.com](https://netacad.com)



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## NDG Linux Essentials

Learn the fundamentals of the Linux operating system and command line and basic open source concepts.

[Enroll Now](#)



# Content, objectives and key terms

Content

Objectives

Key Terms

## Locale

The term locale refers to a set of parameters that define the user's language, country and any special variant preferences. These parameters include the following:

- Language
- Numeric representation
- Date-and-time representation
- Monetary units and symbols
- Case conversion - for proper case mapping of characters
- String collation - for determining sort order rules for a country
- Character classification - determines the correct set of characters, digits, punctuation and symbols.

## Localization

To serve different cultures, a program should be able to determine its locale and act accordingly. Localization is the process of creating or adapting a product to be suitable for a specific group in terms of language, culture and targeted needs.

There are two methods of providing locale information:

1. Locally run programs use locale information provided by environment variables.
2. Web-based applications use locale information either obtained from the web browser or is explicitly requested as a form value.

## Locale Naming Convention

Locale definition files are used to define the language, territory and code set information applicable to the user. Locale definition files use the following naming convention:

```
language[_territory][.codeset][@modifiers]
```

The same language and territory using the ISO8859-15 code set (the the latest Latin alphabet (No. 9) including the Euro symbol and other updates) is indicated by `da_DK.ISO8859-15`.

The most common character code set used today is UTF-8 (Universal Character Set + Transformation Format - 8-

>\_ Ubuntu PC

```
* Starting domain name service... bind9 [ OK ]
Welcome to Ubuntu 14.04 LTS (GNU/Linux 3.13.0-79-generic x86_64)

* Documentation: https://help.ubuntu.com/

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

This lab has two user accounts (username :: password )

root      :: netlab123
sysadmin  :: netlab123

Press the [Enter] key to begin...
```

# Virtual machine for “learn by doing”

Content

Objectives

Key Terms

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>\_ Ubuntu PC



```
sysadmin@localhost:~/test$
```

# Labs Exercises to Reinforce Skills

## NDG Hosts Labs and Virtual Machines

Content

### Step 3

Change the `LC_NUMERIC` locale variable to `C.UTF-8` by executing the following command:

```
export LC_NUMERIC="C.UTF-8"
```

```
sysadmin@localhost:~$ export LC_NUMERIC="C.UTF-8"
```

[◀ Previous](#)

[Next ▶](#)

>\_ Ubuntu PC

```
sysadmin@localhost:~$ locale
LANG=
LANGUAGE=
LC_CTYPE="POSIX"
LC_NUMERIC="POSIX"
LC_TIME="POSIX"
LC_COLLATE="POSIX"
LC_MONETARY="POSIX"
LC_MESSAGES="POSIX"
LC_PAPER="POSIX"
LC_NAME="POSIX"
LC_ADDRESS="POSIX"
LC_TELEPHONE="POSIX"
LC_MEASUREMENT="POSIX"
LC_IDENTIFICATION="POSIX"
LC_ALL=
sysadmin@localhost:~$ locale -a
C
C.UTF-8
POSIX
sysadmin@localhost:~$ export LC_NUMERIC="C.UTF-8"
sysadmin@localhost:~$
```

# Assessments

## Chapter Quizzes, Midterm, Finals

Courses ▾ ▾

Grades

Calendar

NDG101

🏠 > [NDG101](#) > [Assignments](#) > Chapter 04 Exam

Time elapsed: 58 seconds

Home

Modules

[Assignments](#)

Grades

Help & Resources

Collaborations

1

### Question 3

A pair of single quotes ( ' ) will prevent the shell from interpreting any metacharacter.  
True or False?

True

False

### Question 4

A pair of double quotes ( " ) will prevent the shell from interpreting any metacharacter.  
True or False?



# Instructor Resources

## Presentations Available for Each Chapter

**Module 3: User and System  
Administration  
Chapter 7: User and Group  
Accounts**



### **User and Group Accounts**

- Linux is a multiuser operating system, allowing multiple users to access the system simultaneously.
- User and group accounts facilitate this by controlling the access allowed for different types of users.
- To execute the commands in this section, root privileges are required.



# Before you get started guide to help learners

2

## 21.6 Mounting Filesystems Automatically On Boot

- 21.1
- 21.2
- 21.3 Manually mounting filesystems with the `mount` command results in a non-persistent mount. If the system is rebooted, then the
- 21.4 `mount` command must be used again. The same is true for activating swap devices with the `swapon` command.
- 21.5 The `/etc/fstab` file is used to configure what filesystems will be mounted automatically at boot. It can also be used to
- 21.6 automatically activate swap devices. It may be helpful to think of this file as the *filesystem table* to remember its name. To
- 21.7 those familiar with mounting a filesystem manually the format of the file should make sense.
- 21.8
- 21.9 Root privileges are required to make changes to the `/etc/fstab` file. Any changes made to this file should be performed
- 21.10 with care, as mistakes may prevent the system from booting normally.
- 21.11 In fact, it would be an excellent idea to create a backup of the `/etc/fstab` file before making changes. In the event of a disaster, the original file can be restored by copying the backup to the `/etc/fstab` file using a recovery of a live disk. To make a backup copy, as the root user, execute a command like the following:

5

```
root@localhost:~# cp /etc/fstab /etc/fstab.backup
```

A system with three filesystem partitions and one swap partition might have an `/etc/fstab` file that looks like the following:

```
#
# /etc/fstab
# Created by anaconda on Fri Jan 17 10:31:51 2014
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
UUID=3db6ba40-67d2-403d-9c0a-9a901697cd8d / ext4 defaults 1 1
UUID=09d641d5-bc5a-4065-8d80-8ae797dfa7f3 /boot ext4 defaults 1 2
UUID=5ee634a5-c360-4211-a41b-9aa40d78a804 /home ext4 defaults 1 2
UUID=34819281-65e3-4c78-ba2d-16952684c9cb swap swap defaults 0 0
tmpfs /dev/shm tmpfs defaults 0 0
devpts /dev/pts devpts gid=5,mode=620 0 0
sysfs /sys sysfs defaults 0 0
proc /proc proc defaults 0 0
```

```
Starting system logger: service... bind9 [ OK ] [ OK ]
Starting crond: u 14.04 LTS (GNU/Linux 3.2.0-58-generic x86 [ OK ]
Generating SSH1 RSA host key: [ OK ]
Generating SSH2 RSA host key: p.ubuntu.com/ [ OK ]
Generating SSH2 DSA host key: [ OK ]
Starting sshd: cluded with the Ubuntu system are free softw [ OK ]
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
```

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law.

```
sysadmin@localhost:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos test
sysadmin@localhost:~$ su
Password:
root@localhost:~# blkid
/dev/sr0: LABEL="config-2" TYPE="iso9660"
/dev/sda1: SEC_TYPE="msdos" LABEL="EFI-SYSTEM" UUID="1400-C495" TYPE="vfat"
/dev/sda3: LABEL="USR-A" UUID="0c3b7acb-f3ad-499d-bfa0-9ada392aa3ed" SEC_TYPE="e
xt2" TYPE="ext4"
/dev/sda6: LABEL="OEM" UUID="515383b3-5f56-4cc2-be87-b93382a8869e" TYPE="ext4"
/dev/sda9: LABEL="ROOT" UUID="c73b8747-5873-4904-b7a1-2eaed8ca3add" UUID_SUB="83
```

3

# “Help Button” for FAQ and Email Support

- 9.1
- 9.2
- 9.3
- 9.4
- 9.5

## 9.3 Command Mode Actions

The standard convention for editing content with word processors is to use copy, cut, and paste. The `vi` program has none of these, instead `vi` uses the following three commands:

Standard	Vi	Meaning
cut	d	delete
copy	y	yank
paste	P   p	put

The motions learned from the previous page are used to specify where the action is to take place, always beginning with the present cursor location. Either of the following general formats for action commands is acceptable:

```
action [count] motion
```

```
[count] action motion
```

### Delete

Delete removes the indicated text from the page and saves it into the buffer, the buffer being the equivalent of the "clipboard" used in Windows or Mac OSX. The following table provides some common usage examples:

- Frequently Asked Questions
- Submit Feedback
- Start Tour

```
* Starting domain name service... bind9 [ OK ]
Welcome to Ubuntu 14.04 LTS (GNU/Linux 3.13.0-79-generic x86_64)

* Documentation:  https://help.ubuntu.com/

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

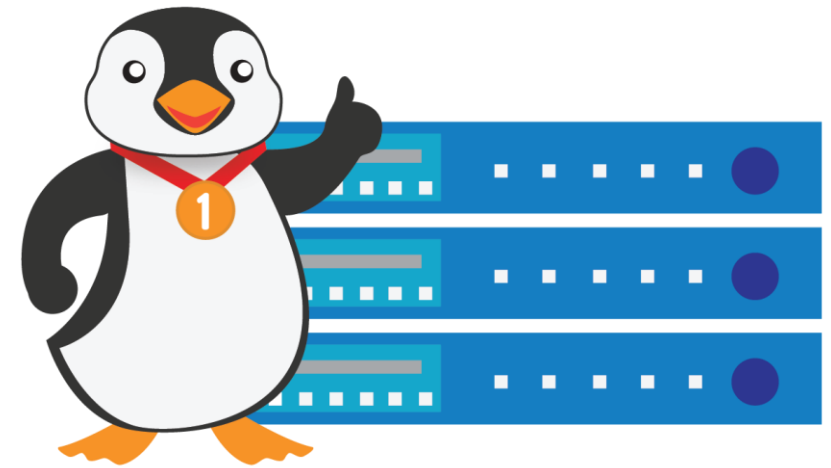
This lab has two user accounts (username :: password )

root      :: netlab123
sysadmin  :: netlab123

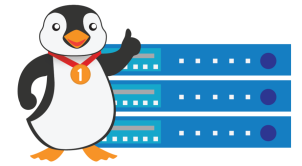
Press the [Enter] key to begin...
```

# NDG Linux I course 1 for exam 1 Linux+

- Aligns to CompTIA Linux+ powered by LPI and LPI LPIC-1 (Exam 1 of 2)
- Designed to be a Full Semester Course
  - With lectures, content, labs and assessments
- Higher level of rigor than Linux Essentials
- 27 chapters
- 24 lab exercises
- Assessments
  - Chapter, Midterm and Final
- Languages: English

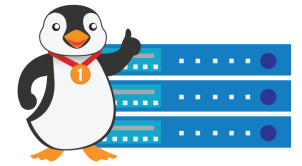


# NDG Linux I Objective Alignment

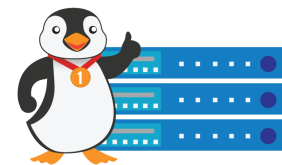


Title of Chapter	Linux Professional Institute LPIC-1 101 Certification Objectives
Before You Get Started	Course Introduction
1 Using the Shell	103.1 Work on the command line
2 Getting Help	103.1 Work on the command line
3 Text Utilities	103.2 Process text streams using filters
4 Configuring the Shell	103.1 Work on the command line
5 File Manipulation	103.3 Process basic file management
6 File Globbing	103.3 Process basic file management
7 Finding Files	103.3 Process basic file management 104.7 Find system files and place files in the correct location
8 Regular Expressions	103.7 Search text files using regular expressions
9 The vi Editor	103.8 Perform basic file editing operations using vi
10 Standard Text Streams and Redirection	103.4 Use streams, pipes and redirects
11 Managing Processes	103.5 Create, monitor and kill processes 103.6 Modify process execution priorities
12 Archive Commands	103.3 Process basic file management
13 File Permissions and Ownership	104.5 Manage file permissions and ownership

# NDG Linux I Objective Alignment



Title of Chapter	Linux Professional Institute LPIC-1 101 Certification Objectives
14 File Systems Links	104.6 Create and change hard and symbolic links
15 Hardware Configuration	101.1 Determine and configure hardware settings
16 The Boot Process	101.2 Boot the system
17 Bootloaders	102.2 Install a boot manager
18 Runlevels	101.3 Change runlevels and shutdown or reboot system
19 Designing a Scheme	102.1 Design hard disk layout
20 Creating Partitions	102.1 Design hard disk layout 104.1 Create partitions and filesystems
21 Mounting Filesystems	102.1 Design hard disk layout 104.3 Control mounting and unmounting of filesystems
22 Maintaining Integrity	104.2 Maintain the integrity of filesystems
23 Fixing Filesystems	104.2 Maintain the integrity of filesystems
24 Disk Quotas	104.4 Manage disk quotas
25 RPM Package Management	102.5 Use RPM and YUM package management
26 Debian Software Management	102.4 Use Debian package management
27 Managing Shared Libraries	102.3 Manage shared libraries



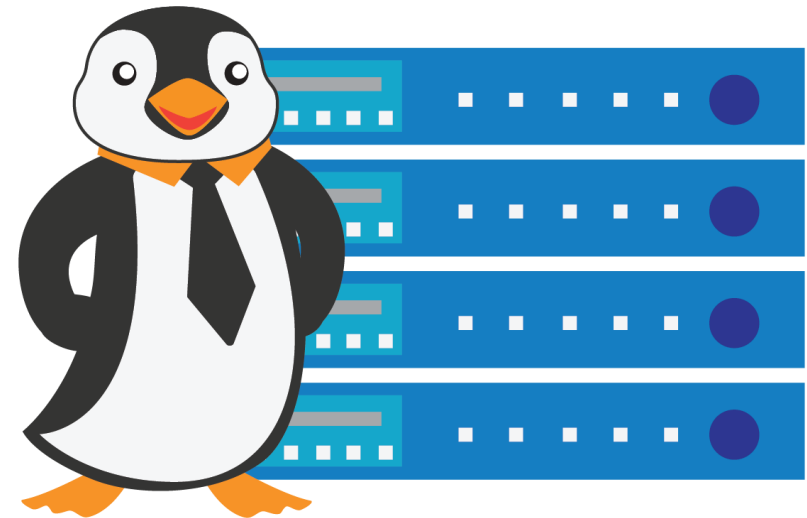
# NDG Linux I Course Feedback

To what extent will this course (Linux I) help your students?

Question	Mean
Prepare for certification exams?	4.9 out of 5
Learn skills that can be used in current or future jobs?	4.81 out of 5
Increase their value in the job market?	4.81 out of 5
Obtain a new job or advance career?	4.57 out of 5

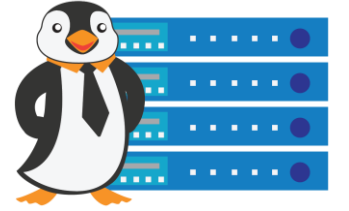
# NDG Linux II course 2 for exam 2 Linux+

- Aligns to CompTIA Linux+ powered by LPI or LPI LPIC-1 (Exam 2 of 2)
- Designed to be a Full Semester Course
  - With lectures, content, labs and assessments
- 19 chapters
- 19 lab exercises
- Assessments
  - Chapter, Midterm and Final
- Languages: English



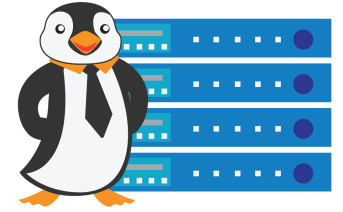


# NDG Linux II Objective Alignment



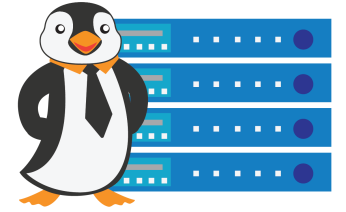
Title of Chapter	Linux Professional Institute LPIC-1 102 Certification Objectives
1 Shell Customization	105.1 Customize and use the shell environment
2 Introduction to Shell Scripts	105.2 Customize or write simple scripts
3 SQL	105.3 SQL data management
4 X Windows Components	106.1 Install and configure X11
5 Configuring Display Managers	106.2 Setup a display manager
6 Accessibility	106.3 Accessibility
7 User and Group Accounts	107.1 Manage user and group accounts and related system files
8 Scheduling Jobs	107.2 Automate system administration tasks by scheduling jobs
9 Localization	107.3 Localization and internationalization
10 System Time	108.1 Maintain system time

# NDG Linux II Objective Alignment



Title of Chapter	Linux Professional Institute LPIC-1 102 Certification Objectives
11 Logging	108.2 System logging
12 Email Configuration	108.3 Mail Transfer Agent (MTA) basics
13 Printer Management	108.4 Manage printers and printing
14 Networking Fundamentals	109.1 Fundamental of internet protocols
15 Network Configuration	109.2 Basic network configuration
	109.4 Configure client side DNS
16 Troubleshooting Networks	109.3 Basic network troubleshooting
17 Account Security	110.1 Perform security administration tasks
18 Host Security	110.2 Setup host security
19 Encryption	110.3 Securing data with encryption

# GUI Capable Virtual Machines - Demo



```
CentOS release 6.6 (Final)  
Kernel 2.6.32-504.16.2.el6.x86_64 on an x86_64  
  
centos login: _
```

# Testimonials about NDG Linux courses

## **Quote from Cisco engineer:**

"I finished both NDG Linux I and II courses, and was able to get Linux+ certified as well. These were some of the best self-study training materials I've had, and I would definitely recommend them to others. They give you all the academic, hands-on and test-prep you could want on this subject matter. Very nice work."

## **Quote from Intel employee:**

" I have got myself trained using your training and material for LPIC-1. I have completed the certification too. Do you have Online training for LPIC-2?"

# Testimonials from instructor community

"My team offers train the trainer programs for Cisco Networking Academies. We decided to trial offering Linux training to our instructor community. We have been very happy with the response: We offered the training on Friday. By Monday I had a full class. Response was so good we offered a second class. We now have a wait list."

Kelly Caudle, Stanly Community College, Cisco Networking Academy ASC / ITC

# How to Purchase Course Access Codes

# Built-into the LMS to make easy for instructor

Courses ▾ ▾

Grades

Calendar

i-i-test

🏠 > i-i-test

Help Center

NDG Introduction to Linux I / Help Center

Home

Modules

Assignments

Grades

Outcomes

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Pages

People

Files

Discussions

Quizzes

Announcements

Collaborations

[Help & Resources](#)

Settings

## Frequently Asked Questions

1. [How do I activate exams properly using the activation tool?](#)
2. [Students are claiming they cannot open the Midterm, Final Exam or the Comprehensive Final Exam, what do I do?](#)
3. [Does this course align to any certification?](#)
4. [What are the minimum requirements for viewing the content of this course?](#)
5. [How can I, as an instructor, view exam questions?](#)
6. [Are any teaching materials provided, such as PowerPoint presentations?](#)
7. [Are the chapter modules and lab content available to download for offline use?](#)
8. [How are the points earned for the labs?](#)
9. [I have a suggestion for some improvements/changes to the course that could provide benefit to the student's learning experience. How can I submit my suggestions?](#)
10. [I am experiencing an error of some kind in the course, how can I report it?](#)
11. [I can't type into the terminal, the loading icon is stuck and/or my terminal is a blank screen. What do I do?](#)
12. [Will the files that I save onto the Linux virtual machine be saved for next use?](#)
13. [Is the Linux VM capable of being connected to the Internet?](#)
14. [Why is the virtual machine not accepting a common command that is an actual command used in another Linux environment?](#)

## Resources

- [Assessment Tool](#)
- [Teaching Materials](#)
- [Purchase Course Access Codes](#)

## Help

- [Feedback](#)
- [Terms](#)



# Can Purchase via PO, Credit Card or Other Service

## i-i-test

🏠 > i-i-test

### Purchase Bulk Course Access Codes

[Help Center](#) / [Purchase Bulk Course Access Codes](#)

#### Why Do I Need Course Access Codes?

This course is offered for a fee by Network Development Group, Inc. The fee, in the form of a course access code, must be entered in order to access this course. The fee may be paid by the learner, or your educational institution may prefer to purchase the access codes and distribute them to the learner.

Click the Buy Now button to go to the order page. Enter the number of course access codes you would like to purchase. Complete the checkout with a valid payment method and the access codes will be emailed to you.

#### Click Buy Now to Begin



Or give the following URL to the purchasing agent for your institution:  
<https://content.netdevgroup.com/buy/6096/>

- Home
- Modules
- Assignments
- Grades
- Outcomes
- Syllabus
- Pages
- People
- Files
- Discussions
- Quizzes
- Announcements
- Collaborations
- [Help & Resources](#)
- Settings



# Learners Can Purchase Individually

Enter Course Access Code

**This course is offered for a fee by Network Development Group, Inc.**

You may purchase a course access code below or one may have been provided to you. The NetSpace course start and end date is controlled by the institution. Course access is set to a maximum of six months. The six months begins when the course access code is activated.

## Purchase Course Access Code

You may access this course by purchasing a course access code from [Network Development Group](#). You can learn more about this course at <https://netdevgroup.com/c/lpic1-s1>.

A course access code

- consists of 8 characters (combination of letters and numbers)
- is **NOT** case sensitive

[\\$ Buy Course](#)

## Demo Course

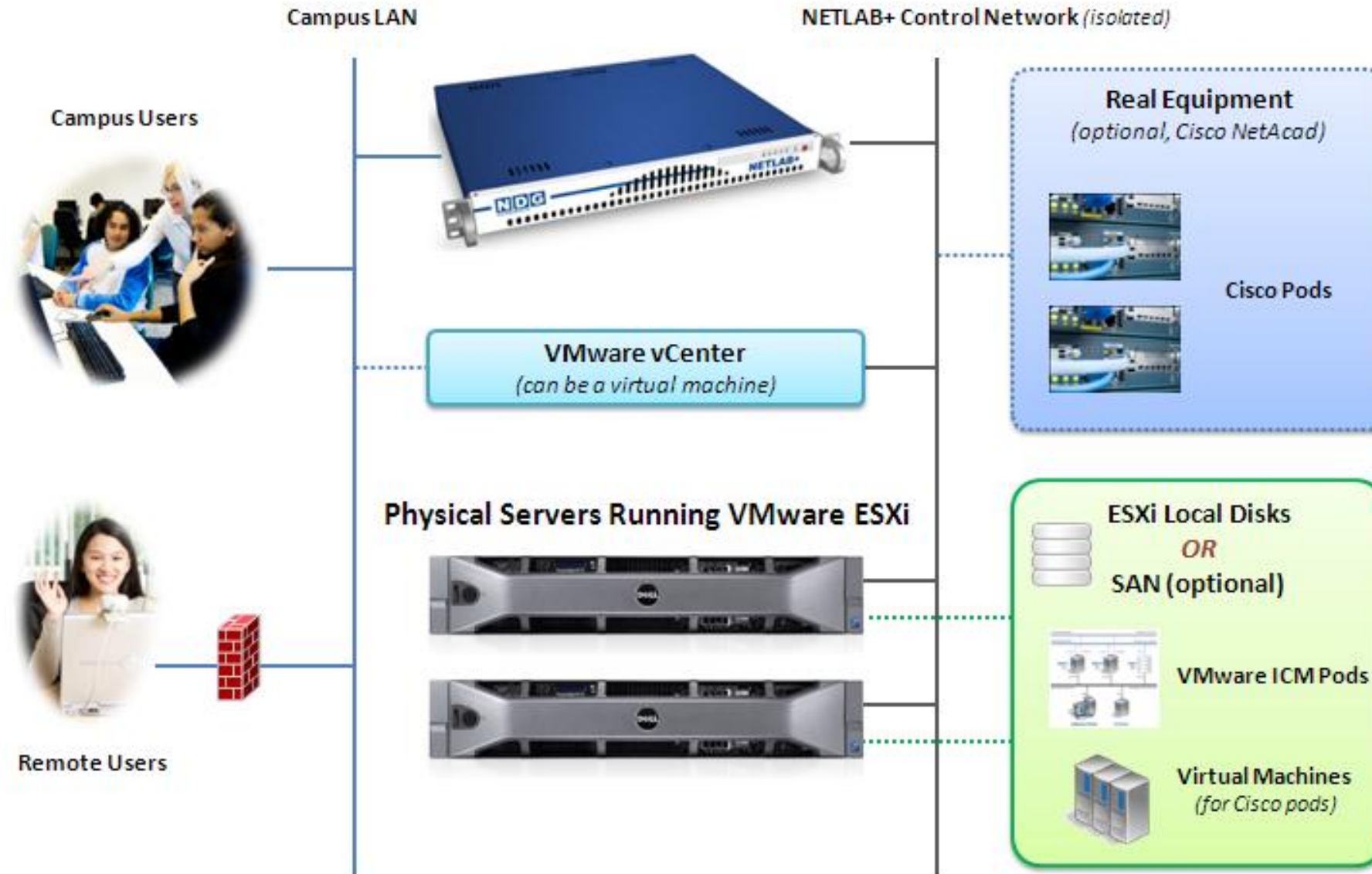


[Launch Demo](#)

If you are unable to find your access code and are enrolled in a class, please contact your instructor for assistance. If you purchased course access but do not have an access code, please contact the organization that sold you access to the course.

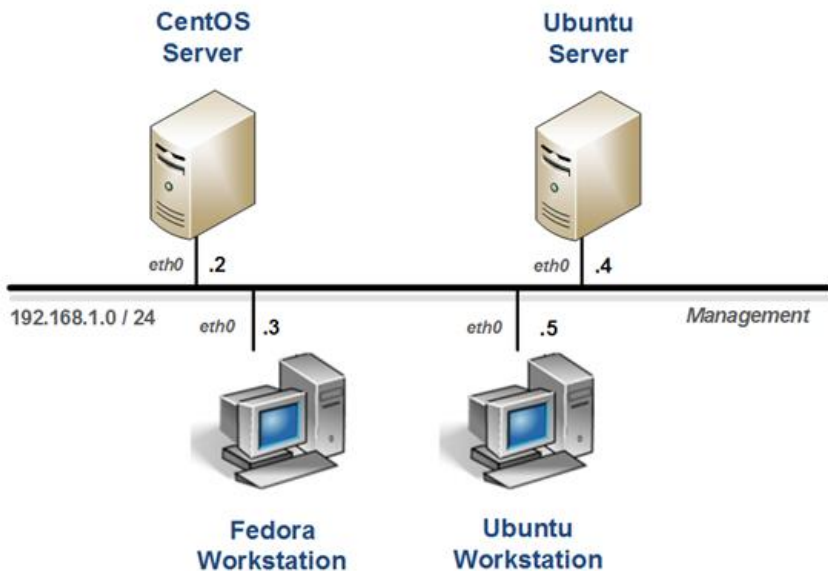
# NETLAB+ Linux Labs

# Product 1: NETLAB+ to host real equipment



# NETLAB+ Linux+ labs

## Topology 1



## Topology 2



## LAB Set 1

Lab	Title
1a	CentOS Server Linux Installation
1b	Ubuntu Desktop Linux Installation
2	Installing Packages and Shared Libraries on Fedora and Ubuntu
3	Displaying Hardware
4	Adding a New Partition
5	Creating filesystem Quotas
6	Booting and Restarting the System
7a	Using the BASH Shell
7b	Using the BASH Shell
7c	Using the BASH Shell
7d	Using the BASH Shell
8	Monitoring Processes
9	Working with Files
10a	Managing Text Files
10b	Managing Text Files
10c	Managing Text Files

## LAB Set 2

Lab	Title
1	Configuring X Windows in CentOS and Fedora Desktop
2	Accessibility Technologies
3	Users and Group Accounts
4a	System Administration Tasks
4b	System Administration Tasks
4c	System Administration Tasks
5	crontab and at
6	Configuring Locale and Time Zone Settings
7a	Working with Email
7b	Working with Email
8	Basic Network Configuration
9	Basic Security Administration
10a	Securing Data with Encryption
10b	Host Security
11a	BASH Shell Features
11b	BASH Scripting
12	Working with a SQL Database

# REGISTER.NETDEVGROUP.COM



NDG Evaluation Center

[Reserve Free Lab Time](#) [FAQ](#) [Profile](#) [Login](#)

## NDG Evaluation Center

NDG is proud to offer evaluation access to the courses below:

You will only need to **register once** to evaluate any of the courses we are offer.



[Already registered? Log in to reserve a lab.](#)

[Need help or have a question?](#)



### Linux Labs

Supporting the following courses:

- NISGTC DOL CompTIA Linux+ Series 1 and 2



### VMware IT Academy

Supporting the following courses:

- VMware vSphere Install, Configure, Manage 5.5
- VMware VCA DCV



### EMC Academic Alliance

Supporting the following courses:

- EMC Cloud Infrastructure and Services (CIS) Series 1 and 2
- EMC Information Storage and Management

# Summary NDG Linux Courses

# Beta for Learners and Instructors to Trial

# [www.netdevgroup.com/try/unhatched](http://www.netdevgroup.com/try/unhatched)



NDG ONLINE ▾

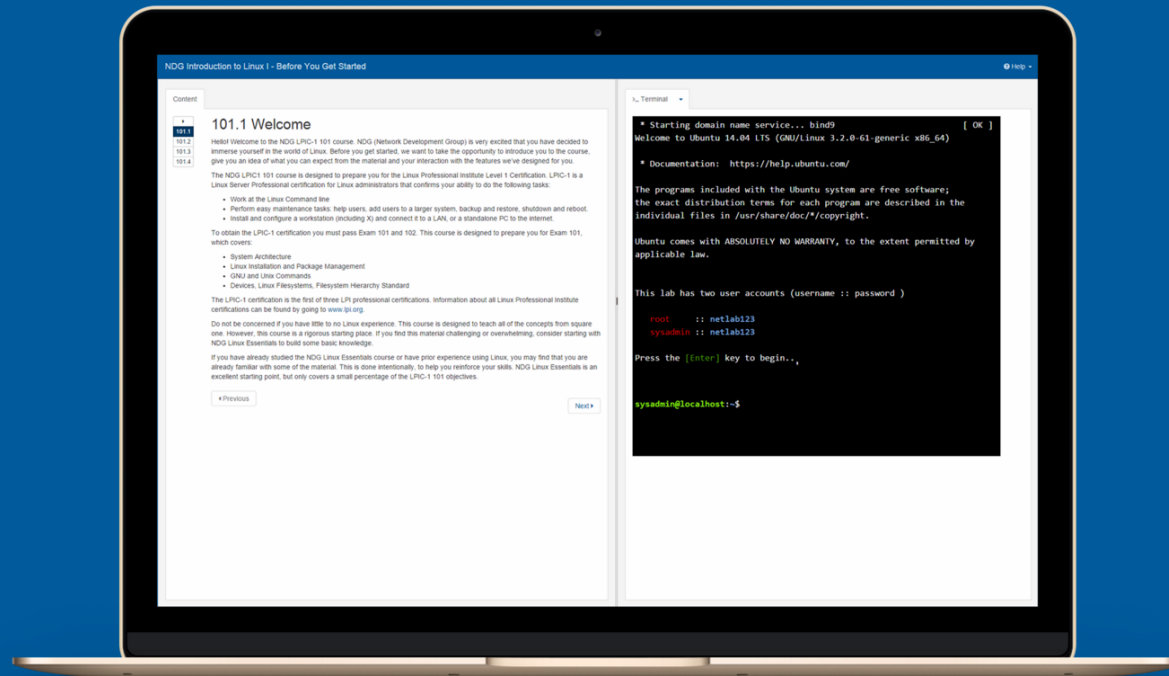
NETLAB+ ▾

SUPPORT ▾

NEWS ▾

CONTACT

## TRY LINUX UNHATCHED



First Name

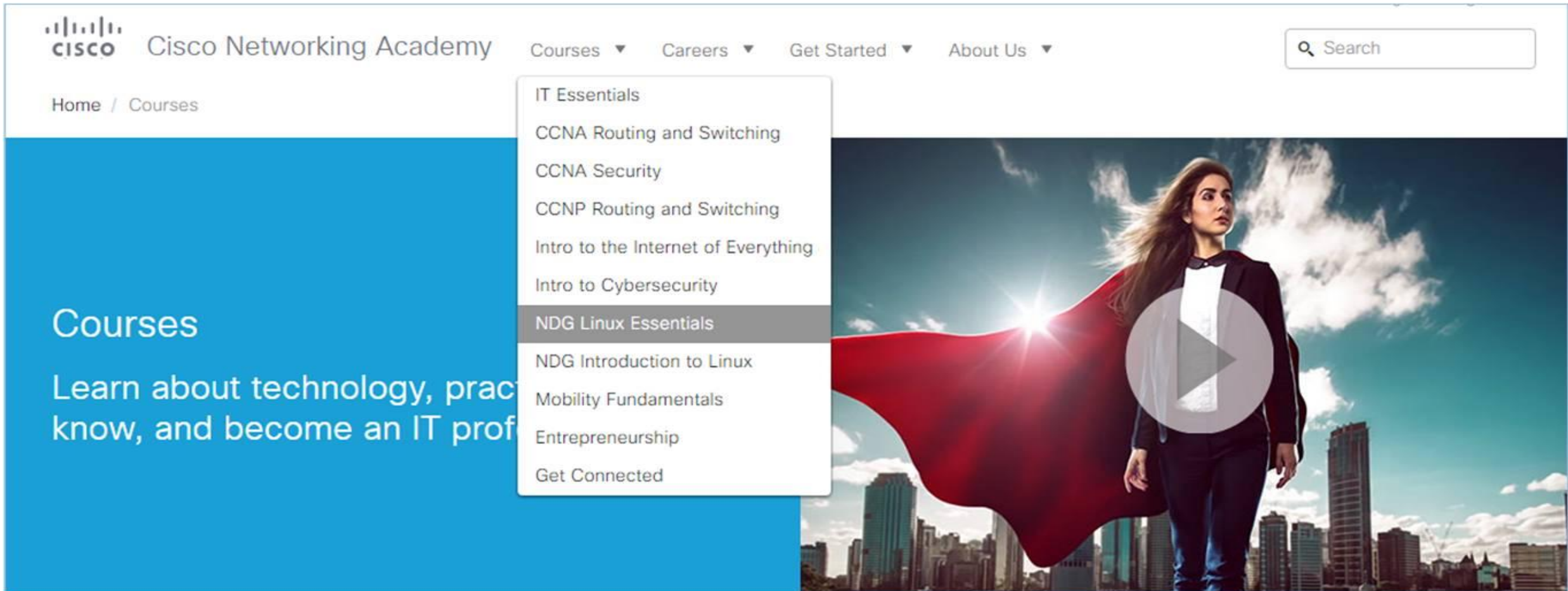
Last Name

Email

I agree to the [terms of use](#) and acknowledge the [privacy policy](#).

→ | NEXT STEP

NDG Linux courses are available Cisco Network Academy  
<http://www.netacad.com>



The screenshot shows the Cisco Networking Academy website. The top navigation bar includes the Cisco logo, the text "Cisco Networking Academy", and menu items for "Courses", "Careers", "Get Started", and "About Us". A search bar is located on the right. Below the navigation, the "Courses" menu is open, listing various courses. The "NDG Linux Essentials" course is highlighted. The main content area features a blue background with the text "Courses" and "Learn about technology, practice what you know, and become an IT professional". To the right, there is a large image of a woman in a red cape, with a play button overlay, suggesting a video player.

Cisco Networking Academy

Home / Courses

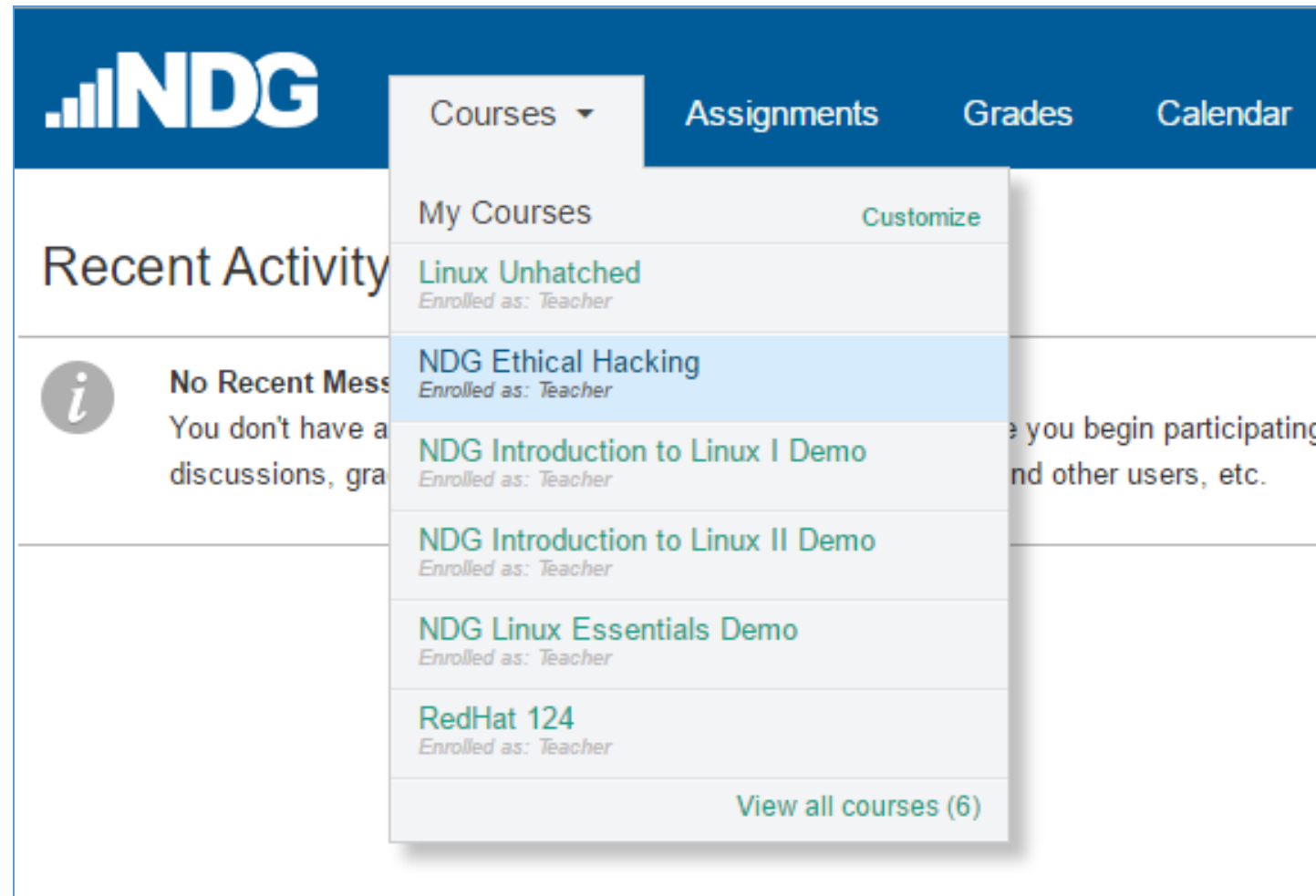
Courses

Learn about technology, practice what you know, and become an IT professional

- IT Essentials
- CCNA Routing and Switching
- CCNA Security
- CCNP Routing and Switching
- Intro to the Internet of Everything
- Intro to Cybersecurity
- NDG Linux Essentials**
- NDG Introduction to Linux
- Mobility Fundamentals
- Entrepreneurship
- Get Connected



NDG can host too if needed. Prefer Cisco use...



The screenshot displays the NDG (Network Defense Gateway) user interface. At the top, there is a dark blue header with the NDG logo on the left and navigation tabs for 'Courses', 'Assignments', 'Grades', and 'Calendar' on the right. Below the header, the main content area is divided into sections. On the left, there is a 'Recent Activity' section with an information icon and a message: 'No Recent Messages. You don't have any discussions, grades, or assignments yet. Once you begin participating with other users, etc.' On the right, there is a 'My Courses' section with a 'Customize' link. A dropdown menu is open under the 'Courses' tab, listing several courses with the user's role 'Enrolled as: Teacher' for each. The courses listed are: 'Linux Unhatched', 'NDG Ethical Hacking', 'NDG Introduction to Linux I Demo', 'NDG Introduction to Linux II Demo', 'NDG Linux Essentials Demo', and 'RedHat 124'. At the bottom of the dropdown menu, there is a link to 'View all courses (6)'.

Course Name	Enrolled as
Linux Unhatched	Teacher
NDG Ethical Hacking	Teacher
NDG Introduction to Linux I Demo	Teacher
NDG Introduction to Linux II Demo	Teacher
NDG Linux Essentials Demo	Teacher
RedHat 124	Teacher