Network Development Group

NDG Linux Essentials

Who Is NDG?

- **Partner to Cisco Networking Academy 12+ years**

- **Mission: Help academic institutions teach IT**

- **Develop software to help academic institutions**
  - NDG NETLAB+ is used to host Cisco equipment
  - NDG NETLAB+ is used to host virtual learning labs
  - 6000+ Cisco devices hosted by academic institutions

- **Develop instructional content aligned to jobs**
  - Help academic programs with new lab content
  - Develop courses to help IT learners with job skills

NDG Linux Essentials Course

- **Developed, offered and supported by NDG**
  - NDG is responsible for all Linux Essentials course content
  - NDG hosts and manages Linux Essentials virtual machines

- **Course is available for Cisco Networking Academies for instructor led training environments**
  - Available via Cisco NetSpace
  - Cisco supports NetSpace (ex: course creation)
  - No cost* for Instructor Led Training (ILT)

- **Aligned to LPI.ORG Linux Essentials Certificate**
  - Linux Professional Institute (LPI.ORG)
  - Linux Essentials Professional Development Certificate
  - Students that pass receive a congratulatory letter with a 20% discount voucher for LE at a Pearson VUE test center

*Exception: Participants of the ACC or NetAcad Licensing program

NDG Linux Essentials Content

- Designed to be a full semester course
  - With lectures, content, labs and assessments
- Sixteen (16) chapters
- Fourteen (14) lab exercises
- Assessments
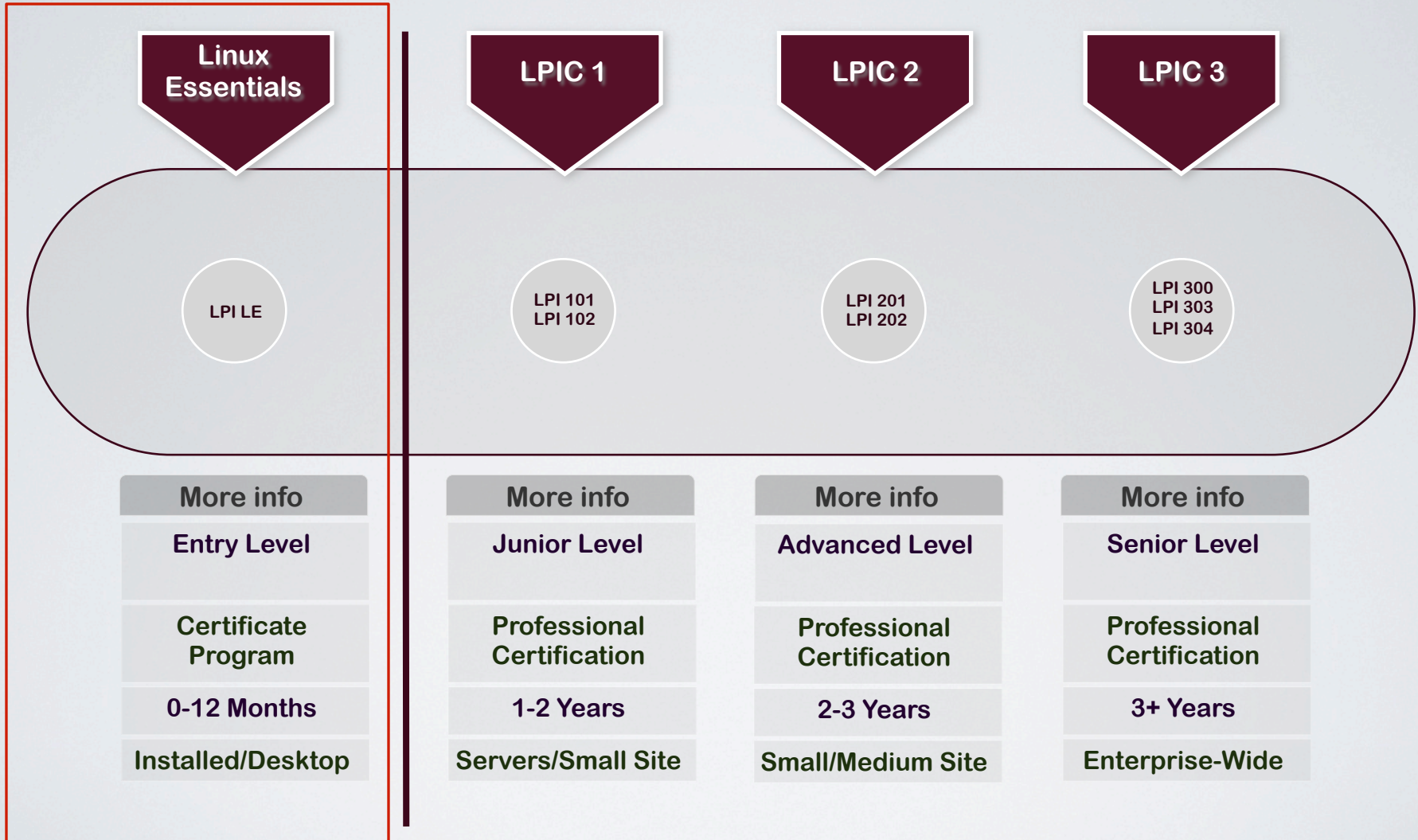 - Chapter, midterm and final
- Instructor presentations for each chapter

NDG Linux Essentials Modules

Title of Learning Module / Chapter	LPI.ORG Linux Essentials Certificate Objectives Covered
	1.1 Linux Evolution and Popular Operating Systems
1 Introduction to Linux	4.1 Choosing an Operating System
	1.2 Major Open Source Applications
2 Open Source Applications and Licenses	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
	2.3 Using Directories and Listing Files
6 Working with Files and Directories	2.4 Creating, Moving and Deleting Files
7 Archiving and Compression	3.1 Archiving Files on the Command Line
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 Goals

- Help learners start to learn Linux

- Align course to LPI Linux Essentials certificate

- Help learners complement other skills with "beginning knowledge of Linux"

Aligned to LPI Linux Essentials

Linux Professional Institute

Linux Essentials	LPIC 1	LPIC 2	LPIC 3
LPI LE	LPI 101 LPI 102	LPI 201 LPI 202	LPI 300 LPI 303 LPI 304
More info	More info	More info	More info
Entry Level	Junior Level	Advanced Level	Senior Level
Certificate Program	Professional Certification	Professional Certification	Professional Certification
0-12 Months	1-2 Years	2-3 Years	3+ Years
Installed/Desktop	Servers/Small Site	Small/Medium Site	Enterprise-Wide

Why Align Course to LPI.ORG?

- **About LPI.ORG: vendor neutral – open source alignment**
  - **Linux and Open Source nonprofit certification organization**
  - **Not a Linux distribution vendor**
  - **Supported by open source community**
  - **Community creates certification questions**

- **Course and certificate align to Linux skills**
  - **Teaching to "core" Linux knowledge**
  - **Learners demonstrate to employers Linux competence**
  - **Learners can choose specific Linux distributions as career, knowledge of various distribution and experience progress**

- **Why open source alignment for academia?**
  - **Vendor neutral lowers cost to academic institution**
  - **Avoid costs associated with joining programs, licensing fees**
  - **Specific distributions increase labor and cost for instructors to prepare to teach in the classroom**

Job Value – LPI Certifications

- Learners demonstrate knowledge of Linux versus focusing on a specific vendor distribution
- Learners build core skills to increase success in future endeavors that require years of experience
- Cloud computing and thin client (BYOD) business models are rapidly increasing the value of open source Linux distributions to employers
  - Note: Many employers value open source Linux as a model to avoid the expenses of specific distribution licensing fees

Who is LPI?

- Leading vendor-independent Linux certification organization
- Providing professional level Linux certifications since 1999
- Candidates are tested across multiple distributions of Linux ensuring they have core skills required for today's jobs

Linux Professional Institute

135,000+ LPI Certified Professionals
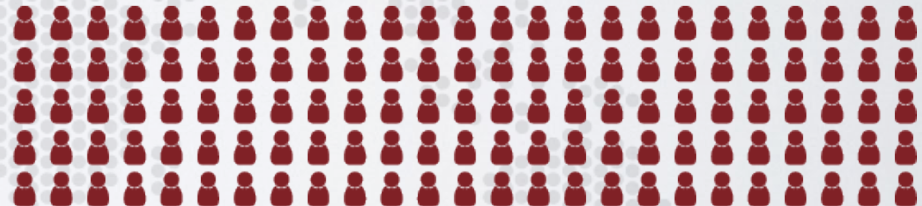
375,000+ Total Exams Given

27 Master Affiliate Country Offices

60 Global Annual Events

7 Exam Languages

LPI Certifications

Linux Essentials	LPIC 1	LPIC 2	LPIC 3
LPI LE	LPI 101 LPI 102	LPI 201 LPI 202	LPI 300 LPI 303 LPI 304
More info	**More info**	**More info**	**More info**
Entry Level	Junior Level	Advanced Level	Senior Level Specialty Areas
Certificate Program	Professional Certification	Professional Certification	Professional Certification
0-12 Months	1-2 Years	2-3 Years	3+ Years
Installed/Desktop	Servers/Small Site	Small/Medium Site	Enterprise-Wide

Linux Essentials Certificate Program

93% of hiring managers plan to hire a Linux professional in the next six months

and almost **90%** said it's difficult to find experienced Linux pros.

This means lots of job opportunities for those with Linux skills.

-2014 Linux Job Report, Linux Foundation & Dice

- Entry-level credential
- Professional Development Certificate
- One exam: Linux Essentials*
- Audience: new Linux users or professionals looking to expand skill set
- Compliments Cisco CCENT and CCNA. Demonstrates to employers that an individual is motivated to learn Linux

*Not available in Japan

- Professional Certification Level 1
- Two exams: 101, 102
- Audience: Junior Level Linux Systems Administrators
- Offered as part of CompTIA Linux+ 3-in-1 Certification (see next slide)

Linux, the final frontier.

Linux is used in space by **NASA**

the Phoenix **Mars Rover**

& even on the International **Space Station**
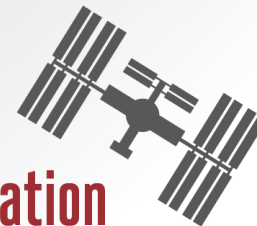
3-in-1 Advantage!

2 Exams

3 Professional Certifications
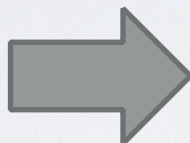
- LPI partners with CompTIA and SUSE
- 2 exams yields 3 leading professional Linux certifications
- No additional cost or testing required
- Pass Linux+ to receive Linux+, LPIC-1 and SUSE certification
- Note: Not available in Japan

Professional Certification: LPIC-2

- Professional Certification Level 2

- Two exams: 201, 202

- Audience: Advanced Level Linux Systems Administrators

Head in the clouds?

Linux powers the cloud.

76% of cloud-enabled organizations use Linux servers for the cloud.

-2013 Enterprise End User Report Linux Adoption, The Linux Foundation

Professional Certification: LPIC-3

It's good to be wanted.

75% of Linux professionals have received a call by a recruiter in the last **6 Months.** ☎

Almost half received **6+ calls!**

- 2014 Linux Job Report, Linux Foundation & Dice

- Professional Certification Level 3
- One specialty exam
- Specialties:
  - 300 – Mixed Environments
  - 303 – Security
  - 304 – Virtualization & High Availability
- Audience: Senior Level Linux Systems Administrators

NDG Linux Essentials Course

Cisco Networking Academy

Mind Wide Open

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NDG101

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NDG Linux Essentials

Change Home Page Layout | See Course Stream

ⓘ Page history

This introduction to Linux course is offered by the Network Development Group (NDG). The skills taught in this course are applicable to a wide range of careers including networking, software development and Linux administration.

This course aligns to the Linux Professional Institute (LPI) Linux Essentials Professional Development Certificate. To learn more about this certificate, visit www.lpi.org/LE ↗ .

How marketable are Linux skills? Before you begin this course, please take a few minutes to review the Linux jobs posted on the Cisco Networking Academy job site www.netacadadvantage.com ↗ .

Go to the **Modules List** to get started!

NDG
www.netdevgroup.com ↗

⚙ Course Setup Checklist
📣 New Announcement
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✏ Edit this Page
⊕ Create a New Page

NDG Linux Essentials Content

1.3.3 Role of Open Source

Linux started out in 1991 as a hobby project by Linus Torvalds. He made the source freely available and others joined in to shape this fledgling operating system. His was not the first system to be developed by a group, but since it was a built-from-scratch project, early adopters had the ability to influence the project's direction and to make sure mistakes from other UNIXes weren't made.

Software projects take the form of *source code*, which is a human readable set of computer instructions. The source code may be written in any of hundreds of different languages, Linux just happens to be written in C, which is a language that shares history with the original UNIX.

Source code is not understood directly by the computer, so it must be compiled into machine instructions by a *compiler*. The compiler gathers all of the source files and generates something that can be run on the computer, such as the Linux kernel.

Historically, most software has been issued under a *closed-source license*, meaning that you get the right to use the machine code, but cannot see the source code. Often the license specifically says that you will not attempt to reverse engineer the machine code back to source code to figure out what it does!

Open source takes a source-centric view of software. The open source philosophy is that you have a right to obtain the software, and to modify it for your own use. Linux adopted this philosophy to great success. People took the source, made changes, and shared them back with the rest of the group.

Alongside this, was the *GNU project* (GNU's, not UNIX). While GNU was building their own operating system, they were far more effective at building the tools that go along with a UNIX operating system, such as the compilers and user interfaces. The source was all freely available, so Linux was able to target their tools and provide a complete system.

There are many different variants on open source, and those will be examined in a later

Linux Terminal   Show/Hide

```
sysadmin@localhost:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
sysadmin@localhost:~$ ls -l
total 32
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Desktop
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Documents
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Downloads
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Music
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Pictures
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Public
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Templates
drwxr-xr-x 2 sysadmin sysadmin 4096 Jan 27 18:35 Videos
sysadmin@localhost:~$
```

Reset   Restart

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NDG Linux Essentials Labs

NDG LE Course Assessments

Instructor Lecture Materials

Power Point Slides for all 16 Chapters

4.1 Linux Essentials Exam Objectives

2.1 Basics of using the Linux command line.

Weight: 2

Description: Basics of using the Linux command line.

Key Knowledge Areas:
- a. Basic shell
- b. Formatting commands
- c. Working with Options
- d. Variables
- e. Globbing
- f. Quoting

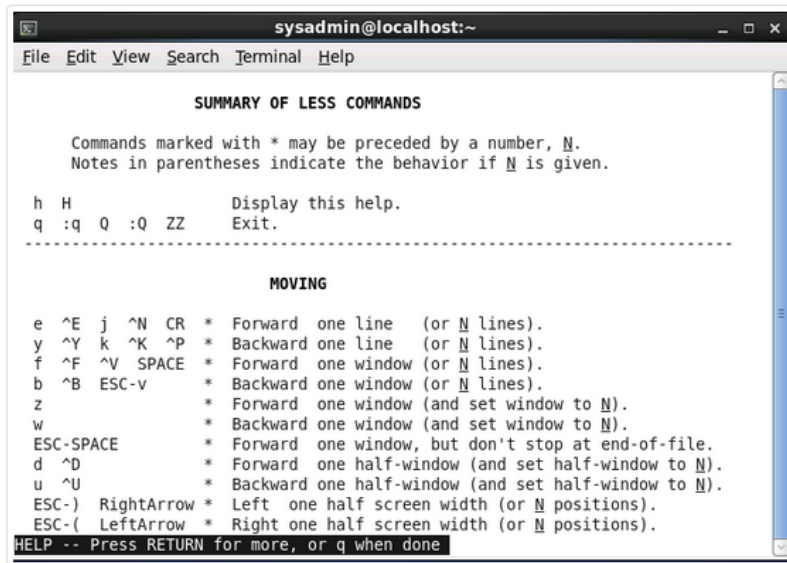The following is a partial list of the used files, terms, and utilities:
- a. echo
- b. PATH environment variable
- c. history
- d. which

NDG Support is All Online

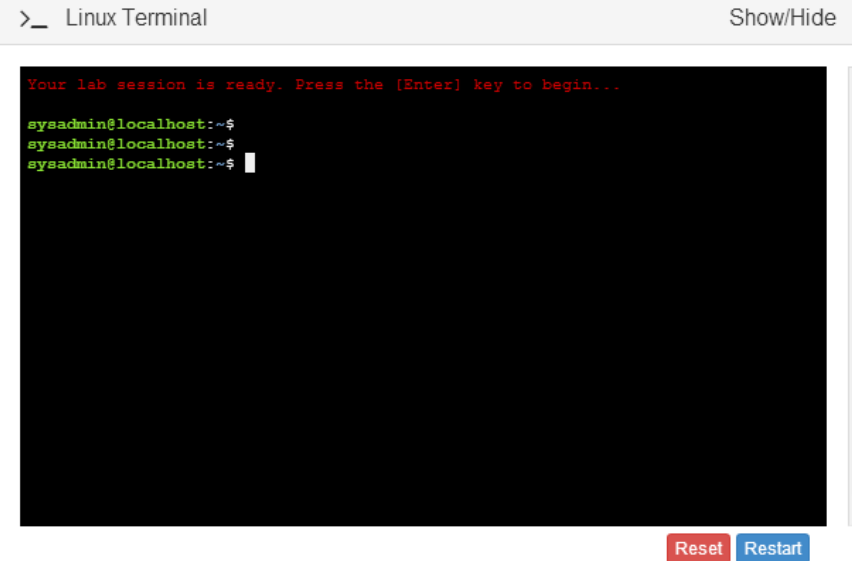**Linux Essentials**

5.3.2 Controlling the man Page Display

The `man` command uses a "pager" to display documents. Normally this pager is the `less` command, but on some distributions it may be the `more` command. Both are very similar in how they perform and will be discussed in more detail in a later chapter.

If you want to view the various movement commands that are available, you can type the letter `h` while viewing a man page. This will display a help page (note: If you are working on a Linux distribution that uses the `more` command as a pager, your output will be different than the example shown here):

```
                    sysadmin@localhost:~              _ □ ×
File  Edit  View  Search  Terminal  Help

                   SUMMARY OF LESS COMMANDS

      Commands marked with * may be preceded by a number, N.
      Notes in parentheses indicate the behavior if N is given.

 h  H                  Display this help.
 q  :q  Q  :Q  ZZ      Exit.
 ---------------------------------------------------------------

                         MOVING

 e  ^E  j  ^N  CR  *  Forward  one line   (or N lines).
 y  ^Y  k  ^K  ^P  *  Backward one line   (or N lines).
 f  ^F  ^V  SPACE  *  Forward  one window (or N lines).
 b  ^B  ESC-v      *  Backward one window (or N lines).
 z                 *  Forward  one window (and set window to N).
 w                 *  Backward one window (and set window to N).
 ESC-SPACE         *  Forward  one window, but don't stop at end-of-file.
 d  ^D             *  Forward  one half-window (and set half-window to N).
 u  ^U             *  Backward one half-window (and set half-window to N).
 ESC-)  RightArrow *  Left  one half screen width (or N positions).
 ESC-(  LeftArrow  *  Right one half screen width (or N positions).
 HELP -- Press RETURN for more, or q when done
```

If your distribution uses the `less` command, you might be a bit overwhelmed with the large number of "commands" that are available. The following table provides a summary of the more useful commands:

Linux Terminal — Show/Hide

```
Your lab session is ready. Press the [Enter] key to begin...

sysadmin@localhost:~$
sysadmin@localhost:~$
sysadmin@localhost:~$
```

Reset   Restart

Consider This...

If you want to send your man page to your default printer, then you may want to execute the man command as follows:

Online Tool to Submit Issues

What if VM fails?

VM Error Message Gives Guidance

Linux Essentials ❓ Help ▾

4.1 Introduction

If you are like most people, you are probably most familiar with using a *Graphical User Interface (GUI)* to control your computer. Introduced to the masses by Apple on the Macintosh computer and popularized by Microsoft, a GUI provides an easy, discoverable way to manage your system. Without a GUI, some tools for graphics and video would not be practical.

Prior to the popularity of the GUI, the *Command Line Interface (CLI)* was the preferred way to control a computer. The CLI relies solely on keyboard input. Everything you want the computer to do is relayed by typing commands rather than clicking on icons.

If you have never used a CLI, at first it may prove challenging because it requires memorizing commands and their *options*. However, a CLI provides more precise control, greater speed and the ability to easily automate tasks through scripting (see sidebar). Although Linux does have many GUI environments, you will be able to control Linux much more effectively by using the Command Line Interface.

>_ Linux Terminal   Show/Hide

An error has occurred. This content system and virtual machine access are provided by Network Development Group (NDG). Please try the following:

- Ensure your OS and web browser meet the minimum system requirements
- Wait at least 30 seconds and refresh the page
- Try restarting/resetting the virtual machine

If the problem persists please report Feedback to NDG and we will address the issue. Utilize the "? Help" linked in the top right corner of this window.

Reset   Restart

```
Consider This...

Scripting is the process of taking a
series of CLI commands, placing them in
a file and having the system execute
each of the commands. It is an excellent
```

← Previous   Next →

LE - Small Market Trial (SMT)

- Over 100+ institutions trialed course

- Student feedback from SMT:
  - 87% would recommend course

- Instructor feedback from SMT:
  - 91% would recommend course
  - 100% plan to offer the course