# Mastering Linux Command-line

## Course Overview

Mastering Linux Command Line                                    GlobaleTraining.com

1

---

## Course Overview

- Linux System Architecture
- Linux File System
- Working with Files & Directories
- Standard I/O & Redirection
- Linux Users & Groups – Concepts
- File Attributes and Permissions
- The vi Editor – Introduction
- Regular Expressions
- Filters & Searching

- Understanding Links
- The Process
- Scheduling Jobs
- Tools & Utilities
- Connecting to Linux Machines
- Customizing Shell Environment
- Shell Scripting - Intro
- Appendix & Miscellaneous

Mastering Linux Command Line                                    GlobaleTraining.com

2

---

## Course Overview

- Quizzes
- Assignments
- PDF resources
- Sample data files
- Links to Internet Resources
- Tests (@ the end)

Mastering Linux Command Line                                    GlobaleTraining.com

3

## How to get best out of this course?

- Access to a Linux System (Physical, Virtual or Cloud)
  - VirtualBox Installation
  - Create Virtual Machine & Install Ubuntu
  - Create AWS Account, Linux EC2 Instance & SSH to EC2 instance.
- Do not skip Quizzes
- Do not skip assignments
- Do not skip tests
- The **more** you **_practice_** the better
- **Learn once, and you will reap the benefits for the years to come.**

Mastering Linux Command Line     GlobaleTraining.com

4

# Linux History

Mastering Linux Command Line     GlobaleTraining.com

5

## Linux – What is it?

- Operating System
- Command Line
- GUI

- Powers:
  - Servers
  - Routers/Switches
  - Desktop/Laptops
  - Electronic Devices
  - etc.

Mastering Linux Command Line     GlobaleTraining.com

6

## You might have heard....

- Sun Solaris
- Linux
- IBM AIX
- Redhat Linux
- HP-UNIX
- Etc.

Mastering Linux Command Line                    GlobaleTraining.com

7

## History

| Year | Event |
|------|-------|
| 1965 | Massachusetts Institute of Technology (MIT), General Electric (GE) and Bell Labs of AT&T worked on a joint project called Multics, with an intention to develop a multi-user operating system. |
| 1969 | Ken Thompson, Dennis Ritchie & others started working on a PDP-7 at AT&T Bell Labs. |
| 1974 | V4 - Re-written in C. |
| 1975 | V6 was made available outside Bells Labs. University of California Berkeley took this as the first version of UNIX for their R&D. |
| 1983 | AT&T released "System V" |
| 1984 | UC Berkeley released BSD 4.2. |
| 1989 | AT&T released "System V, Release 4" |

Mastering Linux Command Line                    GlobaleTraining.com

8

## History

| Year | Event |
|------|-------|
| 1991 | Linus Torvalds (Finland) announced Linux. |
| 1994 | Linux 1.0 Kernel was released |

Mastering Linux Command Line                    GlobaleTraining.com

9

## Unix/Linux Flavors

- BSD
- IBM AIX
- Oracle Solaris
- HP-UX
- SCO

- Ubuntu
- Redhat
- CentOS
- Fedora
- MAC OS

✓ Linux

Mastering Linux Command Line                              GlobaleTraining.com

10

## Many Unix Flavors – WHY?

- AT&T could not legally sell.
- BSD was released to public for free.

Mastering Linux Command Line                              GlobaleTraining.com

11

## Questions...

Who wrote the initial version of Unix Operating System?

Who wrote Linux Kernel ?

12

Globaletraining.com
TRAIN YOUR BRAIN

# Linux System Architecture

Mastering Linux Command Line — GlobaleTraining.com

13

---
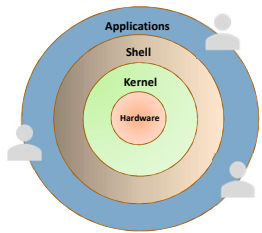
Globaletraining.com
TRAIN YOUR BRAIN

## Linux System Architecture

- Hardware
- Kernel
- Shell
- Applications

Applications
Shell
Kernel
Hardware

Mastering Linux Command Line — GlobaleTraining.com

14

---

Globaletraining.com
TRAIN YOUR BRAIN

## Features of Linux Operating System

- Multi-tasking
- Multi-user
- Highly Portable
- Hierarchical File System
- Shell
- Security
- Everything is treated as files – Files, Folders, Memory, I/O devices etc.

Mastering Linux Command Line — GlobaleTraining.com

15

## Applications of Linux Operating System

- OS – Laptops, Desktops & Servers
- OS – Routers, Switches etc.
- Mobile Phones
- Smart Watches
- Smart TVs
- IoT Devices
- etc

Mastering Linux Command Line

GlobaleTraining.com

16

## Questions...

Which component interacts with the hardware?

17

## Types of Shells

Mastering Linux Command Line

GlobaleTraining.com

18

## Types of Shells

- Bourne Shell (sh)
- C Shell (csh)
- Korn Shell (ksh)
- Bourne-Again Shell (bash)
- Zsh
- Fish – Friendly Interactive Shell

Most Common

Applications
Shell
Kernel
Hardware

Mastering Linux Command Line

GlobaleTraining.com

19

## Remember...

- You can have more than one shell install on a system.
- You can switch between shells on a system.

Mastering Linux Command Line

GlobaleTraining.com

20

## Questions...

What is the most common shell in the Linux world?

Can you have multiple shells installed on a Linux system?

21

## Lab Setup

Mastering Linux Command Line                                    GlobaleTraining.com

22

## Lab Environment

- Local System
- Local Virtual Machine
  - ✓ VirtualBox
  - ✓ VmWare Workstation
- Cloud Environment
  - ✓ AWS
  - ✓ Azure

Mastering Linux Command Line                                    GlobaleTraining.com

23

## Lab Environment

Appendix & Miscellaneous Section

Mastering Linux Command Line                                    GlobaleTraining.com

24

# Connecting To a Linux System
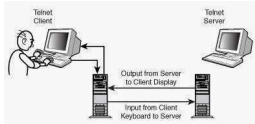
Mastering Linux Command Line

GlobaleTraining.com

25

## Getting Connected

- Local
- Remote Protocols
  - ✓ Telnet
  - ✓ SSH
  - ✓ TFTP
  - ✓ FTP

Mastering Linux Command Line

GlobaleTraining.com

26

## Connecting Locally

- Boot Linux OS.
- You need:
  - ✓ Username
  - ✓ Password

Mastering Linux Command Line

GlobaleTraining.com

27

## Connecting Remotely

- **Remote Client – Command-line**
  - ✓ Telnet (Not Secure)
  - ✓ SSH (Secure)
  - ✓ Putty
  - ✓ Bitvise
  - ✓ Etc.
- **Remote Client - GUI**
  - ✓ VNC
  - ✓ TigerVNC
  - ✓ TeamViewer
  - ✓ Dameware
  - ✓ Etc.

Telnet/SSH Client

Server ubuntu
CentOS

- **Credentials**
  - ✓ Username
  - ✓ Password

Mastering Linux Command Line          GlobaleTraining.com

28

## On The Remote Linux Machine

- **ssh Server** must be installed and running.
- **VNC** or **TeamViewer** or similar software.

Mastering Linux Command Line          GlobaleTraining.com

29

## Connecting Remotely - Putty

- Putty



Mastering Linux Command Line          GlobaleTraining.com

30

## Questions…

What is the common tool that is used to connect to a Linux machine from a windows system?

Can you open multiple SSH sessions using the same user credential from some location or different location?

31

# Linux Command Structure

Mastering Linux Command Line                 GlobaleTraining.com

32

## Linux Commands

- Program written to perform specific action.
- All commands are written using **lower case.**
  - ✓ Example: ls, cd
- Commands can have **0, 1 or more** arguments.

Mastering Linux Command Line                 GlobaleTraining.com

33

## Linux Command Structure

$ **command –argument1 –argument2 –argument3**

**Example**:

$ ls

$ ls –l

$ ls –l –a  (or ls –la)

Mastering Linux Command Line                                    GlobaleTraining.com

34

## Some Basic Commands

| Command | Purpose |
| --- | --- |
| ls | List the contents of a directory |
| cd | Change directory |
| cat | Used to display messages |
| who | Lists the users connected to the system |
| tput | Control the movement of the cursor on the screen |
| tty | Displays the terminal file |
| uname | Displays computer information |
| date | Displays the date |
| cal | Prints calendar |
| passwd | Change the password |
| hostname | Displays the computer name |

| Command | Purpose |
| --- | --- |
| banner | Display the banner message |
| echo | Used to display messages |
| bc | Calculator |

Mastering Linux Command Line                                    GlobaleTraining.com

35

## Directory Commands

**pwd**

- Present Working Directory

**cd**

- Change Directory
- Navigating through the file system

**mkdir**

- Make Directory

**rmdir**

- Remove Directory

Mastering Linux Command Line                                    GlobaleTraining.com

36

## Questions...

Can you remove/delete a non-empty directory using the command "**rmdir**"?

What happens when you run "**cd**" command with no arguments?

How do you determine the computer name?

37

---

### Directory Commands

Globaletraining.com

# pwd

- Present Working Directory
- Displays the current location

- Example:
  - ✓ $ pwd

Mastering Linux Command Line                                    GlobaleTraining.com

38

---

### Directory Commands

Globaletraining.com

# cd

| $ cd | $ cd - |
| $ cd ~ | $ cd .. |

- Change Directory
- Navigating through the file system

- Example:
  - ✓ $ cd /var/log

Mastering Linux Command Line                                    GlobaleTraining.com

39

## Directory Commands

Globaletraining.com

- Make Directory (i.e creating)

# mkdir

- Example:
  - $ mkdir myproject
  - $ mkdir /home/mary/myproject

Mastering Linux Command Line

GlobaleTraining.com

40

## Directory Commands

Globaletraining.com

- Remove Directory (i.e deleting)

# rmdir

- Example:
  - $ rmdir myproject
  - $ rmdir /home/mary/myproject

Mastering Linux Command Line

GlobaleTraining.com

41

Globaletraining.com

# Getting Help!

Mastering Linux Command Line

GlobaleTraining.com

42

## "man" command

- "man" command

- **Example:**
  - ✓ $ man ls



Mastering Linux Command Line      GlobaleTraining.com

43

## man page – Sections (Type of Entry)

| Section | Description |
|---------|-------------|
| 1 | General Commands |
| 2 | System Calls |
| 3 | Library functions, covering in particular the C standard library |
| 4 | Special files (usually devices, those found in /dev) and drivers |
| 5 | File formats and conventions |
| 6 | Games and screensavers |
| 7 | Miscellaneous |
| 8 | System administration commands and daemons |

Mastering Linux Command Line      GlobaleTraining.com

44

## Getting Help

- **man**
- man –k [string]
- --help
- [command] TAB TAB
- apropos
- whatis

Mastering Linux Command Line      GlobaleTraining.com

45

## Questions...

How would you list all the commands that start with "ls"?

**ls{TAB}{TAB}**

Which command is used to search the manual?

**man –k  or  apropos**

What is the syntax to display help for the command "ifconfig"?

**man  ifconfig**

46

---

## Internal Commands

- Built-in commands of the shell
- No additional process.
- Speed → High
- Example:
  - cd, pwd, echo

## External Commands

Globaletraining.com

- Not Built-in commands.
- Stored as separate files
- Separate sub-process.
- Speed → slower than Built-in
- Example:
  - ls, mv, cat

Mastering Linux Command Line                    GlobaleTraining.com

47