



1 : Introduction to System & Network Administration

IT5406 – Systems and Network Administration

Level III - Semester 5

Overview

- Duties of a System administrator
- Introduction to Linux systems.

Intended Learning Outcomes

- At the end of this lesson, you will be able to;
 - Discuss essential duties of System administrator.
 - List the Linux distributions.
 - Explain the man pages and other documentations.
 - Summarise the ethics and code of conducts of the system administrator.

List of sub topics

- 1.1 Essential duties of a System Administrator
- 1.2 Linux distributions
- 1.3 Man pages and other on-line documentation
- 1.4 Ways to find and install software
- 1.5 Specialization and adjacent disciplines
- 1.6 Ethics

1.1 Essential Duties of a System Administrator

- Controlling access
- Adding hardware
- Automating tasks
- Overseeing backups
- Installing and upgrading software
- Monitoring
- Troubleshooting
- Maintaining local documentation
- Vigilantly monitoring security
- Tuning performance
- Developing site policies
- Working with vendors
- Fire fighting

1.2 Linux Distributions

- A Linux distribution comprises of the Linux kernel, which is the core of the operating system, and packages that make up all the commands you can run on the system.
- All distributions share the same kernel lineage, but the format, type, and number of packages differ quite a bit.
- Distributions also vary in their focus, support, and popularity.
- Most major distributions include a relatively painless installation procedure, a desktop environment, and some form of package management.

1.2 Linux Distributions...(2)

Some popular Linux distributions

- Arch
- CentOS
- CoreOS
- Debian
- Fedora
- Kali
- Linux Mint
- openSUSE
- openWRT
- Oracle Linux
- RancherOS
- Red Hat Enterprise
- Slackware
- SUSE Linux Enterprise
- Ubuntu

1.2 Linux Distributions...(3)

- Debian
 - Debian is one of the oldest and most well-regarded distributions.
 - It is a non-commercial project with more than a thousand contributors worldwide



<https://www.debian.org/>

Ref 1: Pg. (10)

1.2 Linux Distributions...(4)

Ubuntu

- Ubuntu is based on Debian and maintains Debian's commitment to free and open source software.
- The business behind Ubuntu is Canonical Ltd., founded by entrepreneur Mark Shuttleworth.
- Canonical offers a variety of editions of Ubuntu targeting the cloud, the desktop, and bare metal. There are even releases intended for phones and tablets.

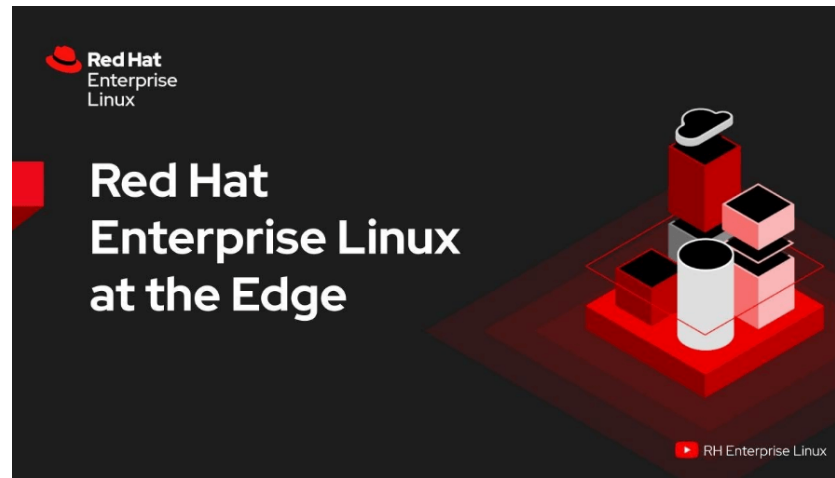


<https://ubuntu.com/>

Ref 1: Pg. (10)

1.2 Linux Distributions...(5)

- RHEL
 - Red Hat Enterprise Linux
 - targets production environments at large enterprises that require support and consulting services to keep their systems running smoothly.



<https://www.redhat.com/en/technologies/linux-platforms/enterprise-linux>

Ref 1: Pg. (10)

1.2 Linux Distributions...(6)

- CentOS
 - CentOS is virtually identical to Red Hat Enterprise Linux, but free of charge.



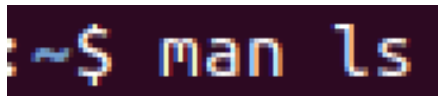
<https://www.centos.org/>

Ref 1: Pg. (11)

1.3 Man pages and other on-line documentation

- The manual pages, usually called “man pages” because they are read with the man command, constitute the traditional “on-line” documentation.
- Program-specific man pages come along for the ride when you install new software packages.
- Man pages are concise descriptions of individual commands, drivers, file formats, or library routines.

To see the manual page of the ls command, type the following command on the terminal of the Linux machine

A terminal window with a dark background. The prompt is '~\$' and the command 'man ls' is entered in a light blue font.

1.3 Man pages and other on-line documentation...(2)

- Man page of the ls command

```
LS(1)                                User Commands                                LS(1)

NAME
    ls - list directory contents

SYNOPSIS
    ls [OPTION]... [FILE]...

DESCRIPTION
    List information about the FILES (the current directory by default).
    Sort entries alphabetically if none of -cftuvSUX nor --sort is speci-
    fied.

    Mandatory arguments to long options are mandatory for short options
    too.

    -a, --all
        do not ignore entries starting with .

    -A, --almost-all
        do not list implied . and ..

    --author
        with -l, print the author of each file

    -b, --escape
        print C-style escapes for nongraphic characters

Manual page ls(1) line 1 (press h for help or q to quit)
```

1.3 Man pages and other on-line documentation...(3)

Sections of a man page

- User-level commands and applications
- System calls and kernel error codes
- Library calls
- Device drivers and network protocols
- Standard file formats
- Games and demonstrations
- Miscellaneous files and documents
- System administration commands
- Obscure kernel specs and interfaces

1.3 Man pages and other on-line documentation...(4)

Other authoritative documentation

- System-specific guides
- Package-specific documentation
- Books
- RFC publications

1.4 Ways to find and Install Software

- Modern operating systems divide their contents into packages that can be installed independently of one another.
- The default installation includes a range of starter packages that you can expand and contract according to your needs.
- Most software is developed by independent groups that release the software in the form of source code.
- Package repositories then pick up the source code, compile it appropriately for the conventions in use on the systems they serve, and package the resulting binaries.

1.4 Ways to find and Install Software...(2)

- How check whether a package is already available in the system?
 - Use **which** command to find out if the relevant binary is already in your search path.

which <application/ package name>

```
~$ which gedit
```

```
/usr/bin/gedit
```

*gedit is the name of the text editor available in Ubuntu

1.4 Ways to find and Install Software...(3)

- Installing new software
 - Install using package manager
 - Use package managers like apt or yum to install application

```
~$ sudo apt install gedit
```

```
~$ sudo yum install gedit
```

- Building software from source code
 - Download the source code, compile the software and install (Ref 1: Pg 23-24)
- Installing from a web script
 - Executing a script which download and install the application

Ref 1: Pg. (23-24)

1. 5 Specialization and Adjacent Disciplines

- System administrators do not exist in a vacuum; a team of experts is required to build and maintain a complex network. Following are some of the roles with which system administrators overlap in skills and scope.
 - DevOps
 - Site reliability engineers
 - Security operations engineers
 - Network administrators
 - Database administrators
 - Network operations center (NOC) engineers
 - Data center technicians
 - Architects

1.6 Ethics

- Professionalism
- Personal Integrity
- Privacy
- Laws and Policies
- Communication
- System Integrity
- Education
- Responsibility to Computing Community
- Social Responsibility
- Ethical Responsibility

Reference : <https://lopsa.org/CodeOfEthics>

References

- Ref 1. Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley and Dan Mackin "UNIX and Linux System Administration Handbook " (5th Edition), Pearson Education, Inc., 2018.