OPERATING SYSTEMS LAB

LAB MANUAL # 01

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Contents

INTRODUCTION TO LINUX

Linux

- Developed in 1991 by a University of Finland student **Linus Torvalds**.

- Basically, a kernel, it was combined with the various software and compilers from GNU Project to form an OS, called **GNU/Linux.**

- Linux is a full-fledged OS available in the form of various **Linux Distributions.**

- **RedHat**, **Fedora**, **SuSE**, **Ubuntu**, **Debian and Kali Linux** are examples of Linux distros.

- Linux is supported by big names as IBM, Google, Sun, Novell, Oracle, HP, Dell, and many more.

Linux Short History

- Inspired by the UNIX OS, the Linux kernel was developed as a clone of UNIX.

- GNU was started in 1984 with a mission to develop a free UNIX-like OS.

- Linux was the best fit as the kernel for the GNU Project.

- Linux kernel was passed onto many interested developers throughout the Internet.

- Linux today is a result of efforts of thousands of individuals, apart from Torvalds.

GNU Project

- Established in 1984 by **Richard Stallman,** who believes that software should be free from restrictions against copying or modification in order to make better and efficient computer programs.

- GNU is a recursive acronym for "**GNU's Not Unix**".

- Aim at developing a complete Unix-like operating system which is free for copying and modification.

- Companies make their money by maintaining and distributing the software, **e.g.** optimally packaging the software with different tools (Redhat, Slackware, Mandrake, SuSE, etc).

- Stallman built the first free GNU C Compiler in 1991. But still, an OS was yet to be developed.

LINUX-Free Software

Free software, as defined by the FSF (Free Software Foundation), is a "matter of liberty (the quality or state of being free), not price."

To qualify as free software by FSF standards, you must be able to:

- Run the program for any purpose you want to, rather than be restricted in what you can use it for.

- View the program's source code.

- Study the program's source code and modify it if you need to.

- Share the program with others.

- Improve the program and release those improvements so that others can use them.

What is significant?

- **Growing popularity**

- **Powerful**

    - Runs on multiple hardware platforms

    - Users like its speed and stability

    - No requirement for latest hardware

- **It's "free"**

    - Licensed under GPL

    - Vendors are distributors who package Linux.

Well known users

- **Google**
    - Google is the world's largest search engine. It runs on Linux.

- **Amazon**
    - Amazon is the world's largest internet bookshop. Amazon.com switched much of its massive internal network to Linux in 2000. By the third quarter of 2001, the company reported saving $17 million, slashing nearly a quarter of its tech expenses.

- **Akamai**

    o Akamai has the world's largest content delivery network. They use Linux servers.

    o Akamai Technologies, Inc. is a global content delivery network, cybersecurity, and cloud service company, providing web and Internet security services.

    o Akamai's Intelligent Edge Platform is one of the world's largest distributed computing platforms.

Linux on servers and supercomputers

- Linux is the most used OS on servers.

- 5 out of 10 reliable web hosting companies use Linux.

- Linux is the cornerstone of the **LAMP** server-software combination (Linux, Apache, MySQL, Perl/PHP/Python) which has achieved popularity among developers.

- Out of top 500 supercomputers, Linux is deployed on 426 of them.

- **LEMP L** stands for Linux, **E** is for Nginx (engine-x), **M** is for MariaDB or MySQL, and **P** stands for PHP, it can be Perl or Python also.

Linux on Embedded Systems

- 16.7% of smartphones worldwide use Linux as OS.

- Linux poses a major competition to the most popular OS is this segment – Symbian.

- Nokia, Openmoko supply Linux on their select smartphones.

Linux on other devices

- Linux can be used on a wide range of electronic devices, like PC, PDAs, Smartphones, iPods, MP3 Players, PlayStation 2 & 3, mission critical servers and so on…

Why we should use Linux

- No threat of viruses.

- Linux systems are extremely stable.

- Linux is Free.

- Linux comes with most of the required software pre-installed.

- Update all your software with minimum fuss.

- Linux never gets slow.

- Linux can even run on oldest hardware.

- Adding more software is a matter of a few clicks.

- Most Windows-only apps have their either their native version or alternatives for Linux.

- With Linux, you get the highest degree of possible customizability.

- It is possible to install/run Windows software on Linux.

Linux

- There are different operating system available for the Linux but we will use Ubuntu OS.

- You can install Ubuntu on **virtual box** or **VMware**.

VirtualBox

- VirtualBox is open-source software for virtualizing the x86 computing architecture. It acts as a **hypervisor**, creating a VM (virtual machine) where the user can run another OS (operating system).

- The operating system where VirtualBox runs is called the "**host**" OS.

- The operating system running in the VM is called the "**guest**" OS.

- VirtualBox supports Windows, Linux, or macOS as its host OS.

VMware

- VMware is a desktop virtualization software platform that is developed by VMware.

- It is **hypervisor software** that is placed on a physical server that allows us to run multiple operating systems on a single server.

- All the resources used by the physical server are used by all servers.

Linux Commands

1. **pwd**

2. **cd /** : will change to root directory.

Again pwd

3. ls command

```
muhammad@muhammad-VirtualBox:/$ ls
bin    dev    lib    libx32      mnt   root  snap       sys  var
boot   etc    lib32  lost+found  opt   run   srv        tmp
cdrom  home   lib64  media       proc  sbin  swapfile   usr
muhammad@muhammad-VirtualBox:/$ 
```

References

Linux Distributions

https://www.tecmint.com/linux-distro-for-power-users/

Good Luck :)