

## **DAY-1 DEVOPS SESSION**

**Ques.** What is GNU project?

**Ans.** The GNU project is a mass collaborative initiative for the development of free software. The GNU Project was launched in 1984 to develop a complete UNIX-like operating system which is free software: the GNU system. The GNU Linux project was started to create a Unix-like operating system created with source code that could be copied, modified, and redistributed.

**Ques.** Difference between UNIX & Linux

**Ans. Linux-**Linux is an open source multi-tasking, multi-user operating system. It was initially developed by Linus Torvalds in 1991. Linux OS is widely used in desktops.

**Unix-**Unix is multi-tasking, multi-user operating system but is not free to use and is not open source. It was developed in 1969 by Ken Thompson team at AT&T Bell Labs. It is widely used on servers, workstations etc.

Following are the important difference between Linux and Unix.

Sr. No.	Key	Linux	Unix

1	Development	Linux is open source and is developed by Linux community of developers.	Unix was developed by AT&T Bell labs and is not open source.
2	Cost	Linux is free to use.	Unix is licensed OS.
3	Supported File systems	Ext2, Ext3, Ext4, Jfs, ReiserFS, Xfs, Btrfs, FAT, FAT32, NTFS.	fs, gpfs, hfs, hfs+, ufs, xfs, zfs.
4	GUI	Linux uses KDE and Gnome. Other GUI supported are LXDE, Xfce, Unity, Mate.	Unix was initially a command based OS. Most of the unix distributions now have Gnome.

5	Usage	Linux is used in wide varieties from desktop, servers, smartphones to mainframes.	Unix is mostly used on servers, workstations or PCs.
6	Default Shell	Bash (Bourne Again SHell) is default shell for Linux.	Bourne Shell is default shell for Unix.
7	Example	Ubuntu, Debian GNU, Arch Linux, etc.	SunOS, Solaris, SCO UNIX, AIX, HP/UX, ULTRIX etc.
8	File system support	Linux supports more file system than Unix.	It also supports file system but lesser than Linux.

9	Coding	Linux is a Unix clone, behaves like Unix but doesn't contain its code.	Unix contain a completely different coding developed by AT&T Labs.
10	Operating system	Linux is just the kernel.	Unix is a complete package of Operating systems.

**Ques.** Integrity check of BIOS - another firmware than BIOS

**Ans.** Drive encryption programs including TrueCrypt, PGP, and BitLocker) adopt a preboot authentication that is launched during the boot process as an extension of the BIOS before the operating system (such as Windows, Linux, Android, iOS, and so forth) is loaded.

The problem is the lack of end-to-end protection. Most software solutions are available only after being loaded by the operating system. In other words, during the boot process—that is, from the moment a user presses the power button to when the operating system takes control and finishes loading the security solutions—

the computer is not benefiting from the services offered by the security measures and is hence vulnerable.

Drive encryption schemes that start during the boot do not depend on the operating system to function, but they do rely on the integrity of the boot loader that loads them.

Instead, the BIOS and boot loader are becoming more interesting targets. A number of such attacks were published in recent years. Here are two examples:

- ***Attacking BIOS:*** This type of attack replaces an authentic BIOS with an attacker's BIOS that contains malicious code. There have been attacks against the UEFI (Unified Extensible Firmware Interface) secure boot.
- ***Attacking boot loader:*** This type of attack usually installs a boot kit (a variant of root kits that runs in the kernel mode) under an attacker's control that infects the boot loader. The boot kit can be used to steal secrets during the boot path; for example, logging the user's drive encryption password.

A computer or motherboard is nothing without the firmware (BIOS). Whenever you start your computer the first thing that starts your computer is BIOS.

## 1. Legacy BIOS

Legacy BIOS is a type of firmware that was used in computers with older motherboards. This firmware used to serve all the functions a firmware should serve but it faced some limitations.

Some of the limitations of Legacy Bios are as follows:-

1. Legacy BIOS contents were stored in Read-Only Memory (ROMs) so you could not rewrite it without removing the chip from the motherboard.
2. Legacy BIOS takes slower boot time.
3. Legacy BIOS fails to recognize drives larger than 2TB and has an all-text menu setup program.

All these points are the reason why Legacy BIOS is being replaced by another type of motherboard firmware that is UEFI.

**Ques.** What is UEFI? Difference between BIOS & UEFI.

**Ans.** UEFI stands for Unified Extensible Firmware Interface. It does the same job as a BIOS, but with one basic difference: it stores all data about initialization and startup in an .efi file, instead of storing it on the firmware.

This .efi file is stored on a special partition called EFI System Partition (ESP) on the hard disk. This ESP partition also contains the boot loader.

### **Difference b/w UEFI & BIOS**

UEFI supports drive sizes upto 9 zetta bytes, whereas BIOS only supports 2.2 terabytes.

UEFI provides faster boot time.

UEFI has discrete driver support, while BIOS has drive support stored in its ROM, so updating BIOS firmware is a bit difficult.

UEFI offers security like "Secure Boot", which prevents the computer from booting from unauthorized/unsigned applications. This helps in preventing rootkits, but also hampers dual-booting, as it treats other OS as unsigned applications. Currently, only Windows and Ubuntu are signed OS.

Ques. When should I go for ubuntu & when for other systems?

Ans. Ubuntu belongs to the Linux family of the Operating system. It was developed by Canonical Ltd. and is available for free for personal and professional support. The first edition of Ubuntu was launched for Desktops. The later editions were meant for Server and Core which is used for the Internet of Things and Robots.

Ubuntu is known to provide an extremely user-friendly environment. The latest version of Ubuntu is Ubuntu 20.04.2 .

### **Advantages-**

- It is available free of cost for both personal and professional use.
- The process of setting up in Ubuntu, especially for the purpose of testing is easy.
- Ubuntu provides an easy user interface.
- Most of the time, the users can avoid the hassle of installation of drivers with this Operating System.
- When Ubuntu Operating System needs to be updated, the users do not need to restart the machine as the updates can easily run in the background. This in turn

makes Ubuntu a preferred choice for services like Server.

Windows is a popular Operating system owned and launched by Microsoft in the year 1985. There has been a lot of improvisation done on Windows as an Operating system and finally, its popularity can be ascertained from the fact that most of the computers for personal use have Windows as the Operating system.

This Operating system provides a smooth and compatible environment for running a variety of applications and software. It also has robust flexibility and high hardware versatility. The latest version of Windows is Windows 10 however, Windows 7 and Windows Pro have been the most successful versions.

### **Advantages-**

- Windows provides a smooth, easy, and user-friendly interface.
- Windows is known for its compatibility as an Operating System and is capable of supporting most applications.
- In case a user encounters an error on Windows, the error details are not completely seen to the user. If a user is not technically sound, the error will still be understood, unlike other Operating systems where the error details seem strange to the user if they are not well versed with those words and error codes.



- The installation process of the Windows Operating System is simple and easy to follow.

Points of Comparison	Windows	Ubuntu
Company	Microsoft	Canonical Ltd
Price	Licensed	Free
Operating system	Windows NT	Linux
Latest version	Windows 10	Ubuntu 20.04.2
Security	Virus attack is common. Antivirus needs to be updated frequently.	In built Antivirus
Microsoft Office	Works well in Windows.	Does not work very well in Ubuntu.
Gaming Supported	Yes	Not meant for games.

Performance standard	Medium	High. Better than Windows.
User friendly	Extremely user friendly. Can be learnt quickly.	Not easy to learn.
Ease of Operation	Mouse and Keyboard needed.	Only keyboard is needed.
Browsing Experience	Good	Faster than Windows.
Suitability for developers	No	Preferred choice by Developers.
Installation of Updates and Restarting machine	YES	Machine does not need restarting. Updates can run in the background.

**Ques.** various operating systems & there uses various Linux distributions

**Ans.** Operating systems contain and manage all the programs and applications that a computer or mobile device is able to run, which means managing the device's software and hardware functions. The functions of an OS include:

- **Booting:** Booting is the process of turning on the computer and powering up the system.
- **Memory management:** This feature controls and coordinates the computer applications while allocating space for programs.
- **Loading and execution:** Your OS will load, or start up, a program and then execute the program so that it opens and runs.
- **Data security:** A good OS includes features that keep your data safe and computer programs secure. Security features are set up to keep unwanted cyberattackers at bay.
- **Disk management:** This manages all the drives installed in a computer, including hard drives, optical disk drives, and flash drives. Disk management can also be used to divide disks, format drives, and more.
- **Process management:** Your OS is designed to allocate resources to different computer processes, enable the processes to share information, protect them, and synchronize them.
- **Device controlling:** Your OS will allow you to open or block access to devices like removable devices, CD/DVDs, data transfer devices, USBs, and more.

- **Printing controlling:** As an extension of device controlling, your OS takes control of the printers that are connected to the computer, and the materials that need to be printed.
- **User interface:** Also referred to as a UI, this is the part of the OS that allows a user to enter and receive information. This can be done with typed commands, code, and other formats.

## **The Five Most Popular Operating Systems**

There are five main types of operating systems. are as follows:

### **Microsoft Windows:**

The Windows OS has been around since the 1980s and has had several versions and updates. Microsoft Windows is one of the popular operating system types and is preloaded on most new PC hardware. With each new Windows update or release, Microsoft continues to work on improving their users' experience, hardware, and software, making Windows more accessible and easier to use.

Microsoft Windows contains a control panel, a desktop and desktop assistant, disk cleanup, event viewer, and more. Many users prefer Microsoft Windows because they say it's compatible with many other kinds of software. Many kinds of computer programs run best on Microsoft Windows because they're developed by Microsoft.

## **Apple macOS:**

Head-to-head in the competition with Microsoft Windows is Apple's macOS. macOS and Windows are both examples of proprietary operating systems, meaning that the company conceptualized, designed, developed, and now sells their own OS. They're designed and sold by the companies and aren't meant to be tampered with or tweaked by users. Apple and Macintosh computers run on the proprietary macOS and OS X system, the first of which launched 20 years ago.

The macOS and Apple/Mac products are also known and beloved by their users for ease of use and continually improving user experience. Fast processing speeds, a simple desktop interface, and a wide variety of helpful resources make users excited about macOS.

## **Google's Android OS:**

The OS that companies including Google use to run its Android mobile smartphones and tablets is based on Linux distribution and other open source software. Android OS is the primary OS for Google mobile devices like smartphones and tablets. Android has gained increasing popularity since its release as an alternative to Apple's iOS for smartphone users and is continuing to increase in popularity with new updates and exciting features.

## **Apple iOS:**

Apple's iOS is another mobile operating system used exclusively for iPhones, some of the most popular mobile devices on the market. iOS integrations have regular updates, new expansions to software, and continually are offering new features for users even if they have older devices. Many users appreciate the unique user interface with touch gestures, and the ease of use that iOS offers. This operating system also allows other Apple devices to connect, giving users easy connections to other devices or people.

## **Linux Operating System:**

Linux is different from Windows and Apple in that it's not a proprietary software, but rather a family of open source systems. In other words, anyone can modify and distribute it. Linux may be the least known on this list, but it's free and available in many different open source versions. Linux is popular because of its ease of customization and offers a variety of options to those who understand how to use it. If you know how to customize and work with operating systems, Linux is an ideal choice. And if this kind of coding and back-end work is interesting to you, it may be a good idea to purchase a Linux system and get started on manipulating it.

The various Linux Distributions are:

- **Ubuntu** - for personal computers & servers
- **Debian** - Bug Tracking
- **CentOs** - Rich base for open source communities
- **Arch Linux** - x86-64 base
- **Fedora** - Vast Software availability, Rapid release of software's, excellent snap support

**Ques.** What does systemd.unit (5) means?

Ans. A unit configuration file whose name ends in ".service" encodes information about a process controlled and supervised by systemd. This man page lists the configuration options specific to this unit type. See [systemd.unit\(5\)](#) for the common options of all unit configuration files. The common configuration items are configured in the generic [Unit] and [Install] sections. The service specific configuration options are configured in the [Service] section.

Additional options are listed in [systemd.exec\(5\)](#), which define the execution environment the commands are executed in, and in [systemd.kill\(5\)](#), which define the way the processes of the service are terminated, and in [systemd.resource-control\(5\)](#), which configure resource control settings for the processes of the service. If a service is requested under a certain name but no unit configuration file is found, systemd looks for a SysV init script by the same name (with the .service suffix removed) and dynamically creates a service unit from that script. This is useful for compatibility with SysV. Note that this compatibility is quite comprehensive but not 100%. For details about the

incompatibilities, see the **Incompatibilities with SysV**[1] document. The number basically corresponds to the section of the manual page.

**Ques.** What are Getty commands and Uname command?

**Ans. Getty Command-** The Getty Command sets and manages terminal lines and ports. The Getty Command is run by the help of init command. This command is linked to the terminal state manager program. The Terminal State Manager program provides combined terminal control and login structures.

### Syntax:

agetty [options] port [baud\_rate...] [term]

**getty** [ [ [-r](#) | [-u](#) | [-U](#) ] [ [-d](#) ] [ [-H](#) *HeraldString* ] [ [-M](#) *motdFile* ] [ [-N](#) ] ]  
*PortName*

### Arguments:

- **port:** It is a pathname relative to the */dev* directory.
- **baud\_rate...** : It is a comma-separated list of one or more baud rates. It should be specified in the descending order.
- **term:** It is the value to be used for the TERM environment variable.

### Options:

- **-8:** Assume 8-bit tty.
- **-a, -autologin:** Automatic login for the specified user.
- **-c, -noreset:** Do not reset control mode.



- **-E, -remote:** Typically the login (1) command is given a remote hostname when called by something such as telnetd(8).
- **-l, -noissue:** Do not display issue file.
- **-J -noclear:** Do not clear the screen before prompt.
- **-m, -extract-baud:** Use extract baud rate during connect.
- **-n, -skip-login:** Do not prompt for login.
- **-p, -login-pause:** Wait for the user to press any key before the login prompt.
- **-s, -keep-baud:** Try to keep previously used baud rate.
- **-t, -timeout:** It will terminate the login session if no user name can be read within *timeout* seconds.
- **-U, -detect-case:** This is used to turn on the support for detecting uppercase-only terminal.

**Uname Command-** Uname Command is used for displaying the information about this system.

SYNTAX- `uname [option]`

OPTIONS-

- **-a →** It prints all the system information in the following order:  
Kernel name, network node hostname, kernel release date, kernel version, machine hardware name, hardware platform, operating system  
Syntax: `$uname -a`
- **-s →** It prints the kernel name.

Syntax: `$uname -s`

- **-n →** It prints the hostname of the network node (current computer).

Syntax: `$uname -n`

- **-r** → It prints the kernel release date.

Syntax: `$uname -r`

- **-v** → It prints the version of the current kernel.

Syntax: `$uname -v`

- **-m** → It prints the machine hardware name.

Syntax: `$uname -m`

- **-p** → It prints the type of the processor.

Syntax: `$uname -p`

- **-i** → It prints the platform of the hardware.

Syntax: `$uname -i`

- **-o** → It prints the name of the operating system.

Syntax: `$uname -o`