Operating Systems/Software Installations

Agenda

- Laptop
- Hardware Config
- BIOS Settings
    - Boot mode
- Disk Types
- Partitioning Types
- Ubuntu Linux Installation
    - Disk naming
    - Swap partition
- Ubuntu software Installations

Session

- 2 hours -- Agenda is given above
- Recording will be shared on Portal (available for a week).
- All notes, slides, and screenshots will be shared on WA group.

Laptop or Desktop

- At Sunbeam, Desktops available as per CDAC policy.
- Laptop benefits
    - No sharing
    - Extend your work at home
    - More confident in practical
    - Interviews

Hardware Config

- Shared on WA group -- course specific.
- CPU: Core-i5 or above
- RAM: 16 GB
    - DITISS -- 16 GB (MUST)
    - DBDA -- 16 GB (MUST)
    - DAC/DMC -- 16 GB (recommended)
    - DESD -- 8 GB+
- Disk: 500 GB or above (SSD is better)
- Graphics: On board
- Note:
    - Mac laptops -- not required for the course.
    - If you already have, please learn its installations.

OS/SW installations

- For all courses at Sunbeam
    - Ubuntu Linux 22.04.x LTS -- from Module 1
    - Native installation (not on VM/WSL) -- Dual boot (if Windows needed as per course requirement)
- How to install Ubuntu?
    - Option 1: Get help from local vendors/experienced friends and get installed on your laptop.
    - Option 2: Listen to session, understand it, read docs shared and then try on your laptop.
        - We will provide online help if required.
- How to install softwares on Ubuntu?

Getting Ready for Ubuntu Installations

- No harm to hardware even if installation went wrong/done mistakes.

- VERY IMPORTANT: Take backup of important data (on external drive, google drive, etc).
- BIOS Settings
    - Disk of your system (SSD or Hard Disk or Both)
    - SATA Controller Mode: AHCI (NO -- RST/Rapid Storage Technology)
    - Intel Virtualization Technology: Enabled
    - Secure Boot: Disabled (preferred)
    - Boot Mode: UEFI or Legacy (do not change)
        - UEFI -- common for modern laptops
    - Boot from USB -- Enabled (on few laptops)
    - Boot Device Priority
        1. Bootable CD/DVD
        2. Bootable Pen drive
        3. Hard disk or Windows Boot Manager
    - F10 (Save and Exit) -- Usually
- VERY IMPORTANT: Ensure that your Windows system is working well (specially if you done any changes in BIOS), before starting Ubuntu installation.
- Disk
- Partitioning

UEFI vs Legacy

- Legacy
    - Older systems -- Older BIOS support
    - Developed by IBM and Microsoft (1980s).
    - Limitations
        - Max disk size 2TB.
        - Partition scheme: MBR
        - No secure boot
        - No OEM locking
- UEFI
    - Unified EFI (Extensible Firmware Interface)
    - UEFI is new EFI (EFI 2.10 onwards)

    - EFI refers to how BIOS of system works -- standard.
    - Availale on all modern systems (2005 onwards)
    - Developed by Intel and HP.
    - Advantages
        - Max disk size: 8 ZB
        - Partition scheme: GPT (also support MBR)
        - Secure boot
        - OEM locking
        - Better hardware support

MBR vs GPT

- Partition -- Logical part of the disk for better organization of data/OS installations.
- Also called as "Drive" in Windows.
- MBR -- Master Boot Record
    - Max 4 partitions -- "Primary" partitions
    - Can make one primary partition as "Extended" partition (like a container)
    - And then create multiple "Logical" partitions in it
    - Note:
        - Windows can be installed only on Primary installation -- First partition of the disk.
        - Linux can be installed on Primary or Logical partition.
- GPT -- GUID Partition Table
    - Each partition is identified by a unique Global ID.
    - Max 128 partitions.

Basic vs Dynamic Disk

- Basic -- Standard disk
    - Partitions shown in "Disk management" are exactly same as in disk.
    - Understood by all OS -- hence possible to install Linux.
- Dynamic -- Logical disk

    - Partitions shown in "Disk management" are logical representation. Actual disk arrangement may be different.
    - Understood by Windows only -- Cannot install Linux on it.
    - Need to reinstall Windows -- delete and recreate new partitions.

Disk encryption

- Disk must NOT be encrypted (like Bitlocker, ...).
- If encrypted, first remove/disable encryption and then start Linux installation.

Disk Naming

- In Linux hard disks are numbered as -- sda, sdb, sdc, sdd, etc.
    - sda -- SATA Disk a (1st)
    - sdb -- SATA Disk b (2nd)
- Hard Disk partitions
    - sda disk partitions: sda1, sda2, sda3, ...
- In few laptops, SSD is named as "nvme".

Linux Partitions

- Need minimum 2 partitions
    - Root partition (/)
    - Swap partition
- Can be created in any sequence.
- / Partition
    - / like "This PC" in Windows.
    - All Linux files will be saved on / partition.
    - Have multiple directories under it.
        - /bin -- binaries
        - /boot -- booting related files
        - /usr -- installed programs
        - /etc -- config files

        - /home -- contains data of users.
            - e.g. "sunbeam" user data is always stored in /home/sunbeam.
- Swap partition
    - If many processes running and RAM is full, then few processes are temporarily kept on swap partition.
    - More details -- OS -- Virtual Memory.

Software Installation

- Connect to WiFi (Internet).
- Open "Terminal"
- command> sudo apt update
- command> sudo apt install gcc git vim openjdk-11-jdk python
- command> sudo snap install vlc
- command> sudo snap install --classic code