# Open Source Software Engineering
## SE ZG587
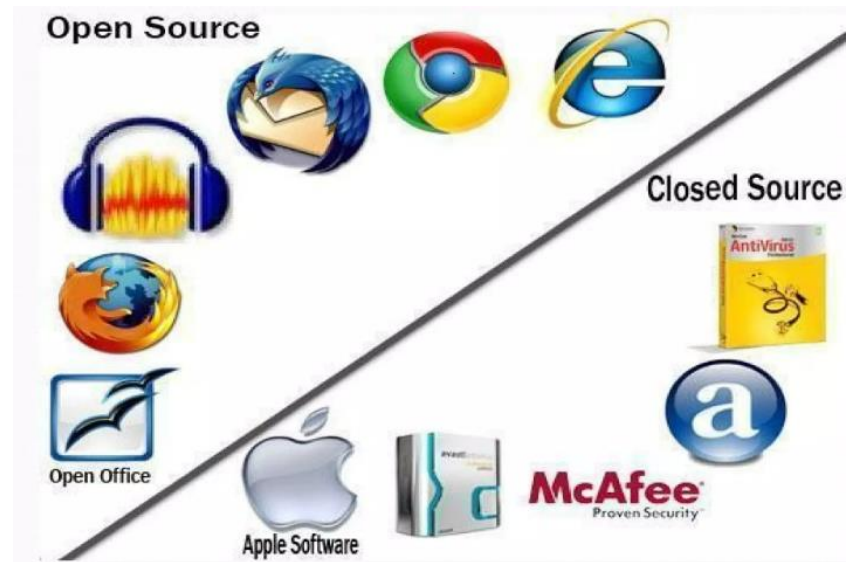
**BITS** Pilani
Pilani Campus

Kumar Manish
29  July, 2023

# Recap : Session 1

- Open source  : What and Why

- Open source Initiatives and examples

- Proprietary Software and examples

- Advantages and Disadvantages of Open source software

# Session 2 : Agenda

- Understanding of Open Source Software

- Principle of Open Source software

- Cost of Open Source Software

- History of Open Source Software

- Other software :

  - Understanding of Free Software

  - Understanding of Freeware

  - Understanding of Public domain software

# Understanding of Open Source Software

Definition : Open source software (OSS) is a software in which

- Source code is released under licenses, and
- The owner of the software (or copyright holder) permits the users the rights to use , modify and distribute the software to anyone  and for any purpose

- Philosophy :  Development methodology – open collaboration Model

- Rules : Governed by rules of Open source Initiative  - open source Definitions (OSD) https://opensource.org/osd)

- Charge : Available free of charge, in most cases . But in principle , it need not necessarily be free of cost.

- Copyright : Yes

- Examples :

# Principle of Open Source software

**Openness :**

Publishing the design and source code of a software to public  - with intent that

- Openly fixed or contributed to
- Openly scrutinised / criticized
- Open feedback obtained
- Analysed for bugs or defects
- Analysed for quality

# Principle of Open Source software..

**Transparency :**

- Ability of the community to see the current progress and future plans :

    - projects roadmap is made available to the community

    - A defects tracking system is put in place  - for reporting and reviewing defects

    - Publish design documents

- To make more effective decision and understand how decision affects us.

**Collaboration :** everyone free to participate, enhance each others work in unanticipated ways to unlock new possibilities

# Principle of Open Source software..

**Release Early and Often :  Rapid prototypes and iterative approach**

- Any changes proposed or made by any one are made public immediately.

- Contributions are expected to occur early – resolve errors early in development Lifecyle

- Contributions are expected to occur Often  - changes shared with others immediately / regularly

  **Expectations of Community :** Participants in an open source projects have expectations of a community  - to be formed – that works together  - to contribute to the development of the projects

# Open Source Software – Open collaborations

The Main Principle behind software  development model are :

- Decentralised Software Development
- Open collaboration, and
- Peer Production

## As per Wikipedia

- Open collaboration is "a System of innovation or Production or Development that relies on  goal-oriented, yet loosely coordinated, participants who interact to create a product (or service ) of economic value, and make it available to contributors and non contributors alike".

# Rules for Distributions of open source Software

- Free Redistributions
- Source code
- Derived works
- Preserving Integrity of Original software
- No discriminations based on Person or groups
- No discrimination based on Field of Endeavours
- Distribution of license
- License should not be product specific
- License Must not restrict other

# Open Source Software – License

**License must not restrict other software  :**

No restrictions should be placed on the license for the other software that would be distributed along with the licensed software .

For example :  the license must not insist that all other programs distributed along with this software and through the same channel, should also be open-source

**License must be Technology neutral :**

License should not be grouped based on any specific technology or interface style

# Open Source Software – Licenses

Open source Licenses  examples :

- Apache Licenses 2.0  (Apache 2.0)
- 3 clause BSD licenses  (BSD -3 clause)
- 2 clause BSD licenses (BSD 2-clasue )
- GNU General Public Licenses (GPL)
- GNU Lesser General public License (LGPL)
- MIT License (MIT)
- Mozilla Public License 2.0 (MPL 2.0)
- Eclipse Public License 2.0 (EPL 2.0)

# Cost of Open source Software

Although OSS is free , there are some hidden cost :

1. Total cost of Ownership (TCO)
   1. Cost associated with adopting and managing the software
   2. Access to software updates, support services

2. Switching cost :
   1. Migrating data from older systems
   2. Training cost to Resources / users etc

3. Additional Cost :
   1. POC/ POV : Evaluation and  Selection
   2. Integration cost
   3. Fixing critical bugs

# History of Open Source Software

**1960** — Hardware Expensive but bundled Free Software

**1970** — Emergence of Operating Systems, Compilers
- Separate selling

**1980** — Free Software Movement

- 1985 : Free Software Foundations (FSF) GNU project

- Berkeley (BSD Unix

- 1991 : Linus Torvalds – Launched GNU LINUX

- 1994 : Robert McCool - Apache HTTP server Open source Webserver

**1990** — Open Source Software Movement

1998 : Bruce Perens and Eric S. Raymond - Open Source Initiatives (OSI) as Organisations Open source definitions (OSD)

# Understanding of Free Software

# Free Software

- Free software" means software that respects users' freedom and community. It refers to free use of software and not price

- **Definition** : Free software is the software that can be **used** , **modified**, **studied**, **copied**, **changed**  and **redistribute** (with or without modifications) with no restrictions.

- **Philosophy** :  Social Movement

- **Charge :** Free software is available free of charge , in the most cases , But , in principle, free software need not necessarily be free of cost;
  - Free software does not mean non commercial
  - One always has freedom to change or copy free software and then sell it.
  - You may even sell the original software

- **Copyright** : Yes

- Examples :

# Free Software – Social Movement

- ## The free software movement is a Social Movement
  - With the aim of gaining and assuring certain freedoms for software users
  - Movement was Founded by Richard Stallman , in 1983, by launching **GNU Project**
  - In 1985 established **The Free software Foundations**

> *"The Free Software Foundation (FSF) is a nonprofit with a worldwide mission to promote computer user freedom. We defend the rights of all software users."*

- ## Four essential Freedoms of free software
  - Software which meets these freedom requirements is termed free software

# Free software – Four essential freedoms

- **A program is "free software" if its users have the following :**
    - Freedom 0 : The freedom to run the program as you wish, for an purpose
    - Freedom 1 : The freedom to study how the program works , and change it as per your requirements
    - Freedom 2 : The freedom to redistribute copies so you can help others
    - Freedom 3 : The freedom to distribute copies of your modified versions to others
        - **Pre-requisite " Access of the source code"**

# Free Software - Legal considerations

- Legal considerations :
  - The owner of the free software does not have power to withdraw or invalidate the license , or add additional restrictions to its terms and conditions,

- The license terms should be permanent and irrevocable

# Free Software - Licenses

A large number of licenses qualify as free software licenses and are fee compatible with GNU General Public licenses :

Examples :

- GNU General Public License (GPL) version 3
- GNU General Public Licenses (GPL) version 2
- GNU All – Permissive License
- Apache License version 2.0
- Clarified Artistic License

Refer a complete list of licenses at :

https: // www.gnu.org/licenses/license-list.html

# GNU in a Nutshell

- GNU was launched by Richard Stallman, as an operating system which would be put together by people working together for the freedom of all software users to control their computing.
- The name of the system, GNU, is a recursive acronym meaning GNU's Not Unix—a way of paying tribute to the technical ideas of Unix, while at the same time saying that GNU is something different.
- Technically, GNU is like Unix. But unlike Unix, GNU gives its users freedom.

**27 September 1983**

GNU project announced by Richard Stallman.

**GNU** Operating System

Supported by the **Free Software Foundation**

# References and further readings

**Open Source Initiative https://opensource.org/**

**Open Source Resources https://opensource.com/**

**Open Source Guides (https://opensource.guide/**

**Working with GitHub for Open Source Software Development (https://github.com/)**

How To Pronounce GNU - GNU Project - Free Software Foundation

GNU in a Nutshell - GNU Project - Free Software Foundation

GNU Licenses https://www.gnu.org/licenses/license-list.html

What We Do - Creative Commons