OPEN SOURCE SOFTWARE (OSS): OVERVIEW

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Abstract : - *Open source has progressed to its present state as a result of many technological breakthroughs in the field of digital communication. It has grabbed the attention of computer industries due to its successful products like GNU/Linux and Apache which appeared as leaders in their respective application area. After the advancement of the Internet, open source grew exponentially that allows thousands of programmers around the globe to collaborate collectively to design the finest software with freely available source code. It has become a sustainable alternative to commercial software. Thus, this chapter describes the genesis and development of source software technology, historical background, intellectual property and licenses, software types and LIS perspective of open source.*

Keywords: Open Source, Software.

MEANING, DEFINITION AND CHARACTERISTICS OF OPEN SOURCE SOFTWARE

Open Source Software means, software which is freely available to anybody and of which source code (use to create a program) is free to view, use, modify and redistribute without any discrimination. It's a collaborative effort where programmers can make changes, improve the source code and share between peers, allow further modifications and incorporate changes within the community. Examples of some popular OSS are Linux, Mozilla Firefox, Liber Office and Apache.

Richard M. Stallman established the Free Software Foundation in 1985. It's a non-profit organization solely dedicated to support and promote the free software movement, freedom to study and modify the software. He defines the term, 'Free Software' means a "software that respects users' freedom and community. It means that the users have the freedom to run, copy, distribute, study, change and improve the software. Thus, 'free software' is a matter of liberty, not price" (Free Software Foundation, 2016).

Mere development of software is not sufficient. It should be associated with certain licensing terms and conditions. In his article (Breeding, 2002)

explains that "Open Source Software can be used freely without any license fee to its developers. It is released under the standard license called General Public License (GPL) which specifies that the software can be used, modified, and distributed free. Under GPL, the software can be changed and enhanced but the new version must also be released under the same terms. With OSS, the underlying source code must be made available along with the binary version that actually runs on a computer. Releasing source code reveals all the details of an application's inner workings. In the open source arena, this facilitates collaborative development. In the commercial arena, releasing source code can be a fundamental contradiction to basic business principle."

Eric Raymond in his book explains the fact about OSS is not a new idea; its tradition goes back to thirty years ago. "The term OSS refers to the software equipped with licenses that provide existing and future users the right to use, inspect, modify, and distribute (modified and unmodified) versions of software to others. It is not only the concept of providing 'free' access to the software and it's a source code that makes OSS the phenomenon but also the development culture." (Raymond E. S., 1999)

Annotation of OSS Definition and Characteristics

The Open Source Initiative has given the definition and characteristic of OSS distribution terms that must fulfill the criteria such as 'free redistribution; source code; derived works; integrity of the author's source code; modification; redistribution, no discrimination against any person or group; no discrimination against fields of endeavor; distribution of license; license must not restrict other software and license must be technology neutral' (Open Source Initiative, Open Source Software Definition and License Distribution Terms, 1998). It is not a software license nor legal document but just a specification that is permissible in software. Distribution terms are explained below in detail with proper rationale and clarity.

1. **"Free Redistribution:** The license shall not restrict any party from selling or giving away the software. As a component of an aggregate software distribution containing programs from several different sources. The license shall not require a royalty or other fees for such sale."

Rationale: It means that you can make multiple copies of the software and either sell or distribute it to anyone without any restrictions. Even, you don't have to pay any fees or royalty to its developer.

2. **"Source Code:** The program must include source code, and must allow distribution in source code as well as compiled form. Where some form of a product is not distributed with source code. There must be a well-publicized means of obtaining the source code for no more than a reasonable reproduction cost, downloading via the Internet without any charges. The source code must be a

preferred form in which a programmer would modify the program. Deliberately obfuscated source code is not allowed. Intermediate forms such as the output of a preprocessor or translator are not allowed."

Rationale: Without access to source code there is no possibility to alter the programming of the software. Further modifications including repair and maintenance can be done only when source code is revealed.

3. **"Derived Work:** The license must allow modifications and derived works, and must allow them to be distributed under the same terms according to the license of the original software."

Rationale: The evolution of the software is not the accomplishment, but is to be maintained; fix bugs and errors; enhancement and modifications are essential. It is mandatory on the co-developers that the derived work has to be distributed under the same licensing terms. The concern among the author was that it should not be an embarrassment for the original author; should not be used for criminal use and spreading virus.

4. **"Integrity of the Author's Source Code:** The license may restrict source code from being distributed in modified form only if the license allows the distribution of 'patch files' with the source code for the purpose of modifying the program at build time. The license must explicitly permit the distribution of software built from modified source code. The license may require derived works to carry a different name or version number from the original software".

Rationale: Authors of the original work afraid that under the pretext of modifications their rights will be seized by other authors. Under the clause integrity of the author's source code they have the right to separate between modifications and their original work by introducing 'patch files'. Linux, Debian, and Red Hat follow this procedure for modifications. They make the program distribute.

5. **"No Discrimination against any Person or Group:** The license must not discriminate against any person or group."

Rationale: This clause does not allow any person or group to be deprived of availing from the benefits of open source. The contribution of any person or group shows the diversity and intentions that open source is for everyone and nobody should be kept out of the process. This came to effect when University of California - Berkeley prohibited the police of South Africa to use an electronic design program.

6. **"No Discrimination against Fields of Endeavor:** The license must not restrict anyone from making the use of the program in a specific field of endeavor. For example, it may not restrict the program from being used in a business or being used for genetic research." **Rationale:** The software must be correspondingly operational to

any field whether it is personal or commercial. Nobody should be excluded. It can be used in an abortion or an anti-abortion clinic.

7. **"Distribution of License:** The rights attached to the program must apply to whom the program is redistributed without the need for execution of an additional license by those parties."

Rationale: There is no opening and closing of the software and no signature is required. It ought to be automatic. It should be treated as a no-signature license.

8. **"License Must Not Be Specific to a Product:** The rights attached to the program must not depend on the program's being part of a particular software distribution. If the program is extracted from that distribution and used or distributed within the terms of the program's license, all parties to whom the program is redistributed should have the same rights as theirs, who are granted in conjunction with the original software distribution."

Rationale: This distribution term excludes additional license deceptions.

9. **"License Must Not Restrict Other Software:** The license must not place any restrictions on other software which is distributed along with the licensed software. For example, the license must not insist that all other programs which are distributed on the same medium must be OSS."

Rationale: The license must not recommend any particular software. It is only compatible software and must be installed. On the contrary, it should allow all other software to merge and run. This clause of open source is associated with aggregation and not derivation.

10. **"License Must Be Technology-Neutral:** No provision of the license can be predicated on any individual technology or style of interface". **Rationale:** This facility is meant to be explicit the licenses which necessitate to the freedom of individuals and groups to select the best suitable technology as per their requirements without dependencies.

GENESIS, DEVELOPMENT AND HISTORICAL BACKGROUND OF OPEN SOURCE SOFTWARE

Computer manufacturers during 1950 to 1960 used to distribute software along with computers. They used to produce their own software or hire software companies to do so. It was sold as a finished product and there was no trend of outsourcing software. Typically software was embedded and the distribution of the software along with computer was a normal practice. At that time source code (human readable programming instructions) was circulated along with the software and users used to alter the software to fix bugs and add new features by themselves. IBM's Airline Control Program (ACP) is the best example. The first use of computer started as a calculating device and later

used in research laboratories. It made researchers collaboration easy for further development across organizational limitations. It became accustomed to share the research among peers and building upon each other's research. Following are the important events that mark the difference in shaping OSS.

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