Chapter 41
What Is Open Source Software (OSS) and What Is Big Data?

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ABSTRACT

This chapter discusses what Open Source Software is and its relationship to Big Data and how it differs from other types of software and its software development cycle. Open source software (OSS) is a type of computer software in which source code is released under a license in which the copyright holder grants users the rights to study, change, and distribute the software to anyone and for any purpose. Big Data are data sets that are so voluminous and complex that traditional data processing application software are inadequate to deal with them. Big data can be discrete or a continuous stream data and is accessible using many types of computing devices ranging from supercomputers and personal workstations to mobile devices and tablets. It is discussed how fog computing can be performed with cloud computing for visualization of Big Data. This chapter also presents a summary of additional web-based Big Data visualization software.

INTRODUCTION: HOW OPEN SOURCE SOFTWARE, FREE SOFTWARE, AND FREEWARE DIFFER

Open Source Software (OSS)

Open-Source Software (OSS) is a type of computer software in which source code is released under a license in which the copyright holder grants users the rights to study, change, and distribute the software to anyone and for any purpose. (Wikipedia (2019a))

For software to be considered "Open Source", it must meet ten conditions as defined by the Open Source Initiative (OSI). Of these ten conditions, it's the first three that are really at the core of Open Source and differentiates it from other software. These three conditions are according to the Open Source Initiative (2007):

1. **Free Redistribution**: The software can be freely given away or sold.
2. **Source Code**: The source code must either be included or freely obtainable.
3. **Derived Works**: Redistribution of modifications must be allowed.

The other conditions are: (Open Source Initiative (2007))

4. **Integrity of The Author's Source Code**: Licenses may require that modifications are redistributed only as patches.
5. **No Discrimination against Persons or Groups**: no one can be locked out.
6. **No Discrimination against Fields of Endeavor**: commercial users cannot be excluded.
7. **Distribution of License**: The rights attached to the program must apply to all to whom the program is redistributed without the need for execution of an additional license by those parties.
8. **License Must Not Be Specific to a Product**: the program cannot be licensed only as part of a larger distribution.
9. **License Must Not Restrict Other Software**: the license cannot insist that any other software it is distributed with must also be open source.
10. **License Must Be Technology**:Neutral: no click-wrap licenses or other medium-specific ways of accepting the license must be required.

Macaulay (2017) discussed benefits of open source software that are summarized in Figure 1 below.

Figure 1. Benefits of Open Source Software (OSS) (Derived from Macaulay (2017))

Benefits of Open Source Software (OSS)

Cost Reduction	Quality Improvement	Quick Time To Market	Full Ownership and Control	Can Drive Innovation with Rapid Pace	Great Flexability with No Vendor Restrictions	Customizable for Integration with Others	Utilization for Collaborative Use To Generate More Robust Results

Open Source License

According to Wikipedia (2019f) an open source license is a type of license for computer software and other products that allows the source code, blueprint or design to be used, modified and/or shared under defined terms and conditions. This allows end users and commercial companies to review and modify the source code, blueprint or design for their own customization, curiosity or troubleshooting needs.

Open-source licensed software is mostly available free of charge, though this does not necessarily have to be the case.

Licenses that only permit non-commercial redistribution or modification of the source code for personal use only are not considered generally as open source licenses.

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